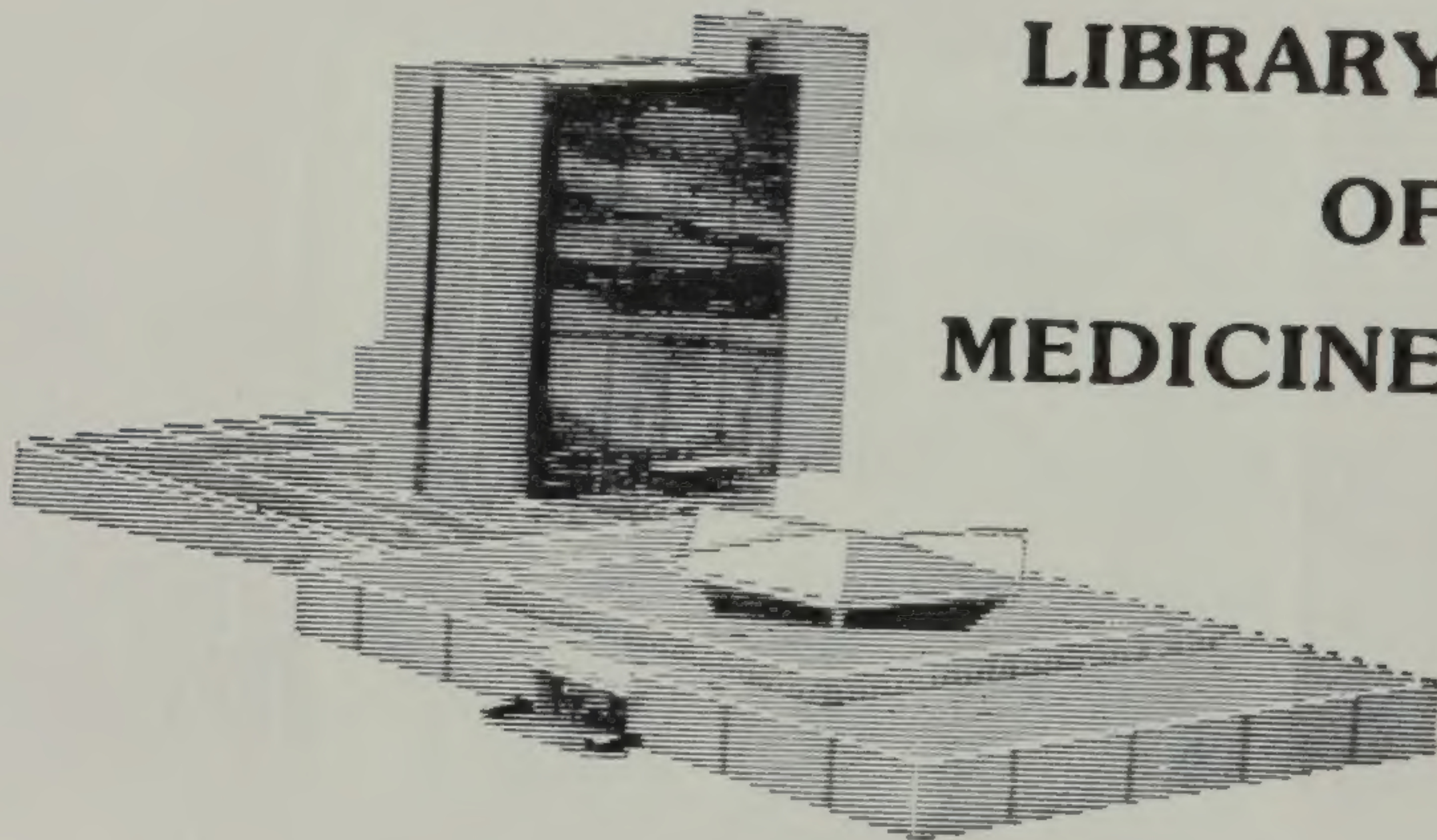




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TEXT BOOK

OF

MEDICAL AND SURGICAL
GYNÆCOLOGY

FOR THE USE OF STUDENTS AND
PRACTITIONERS

BY

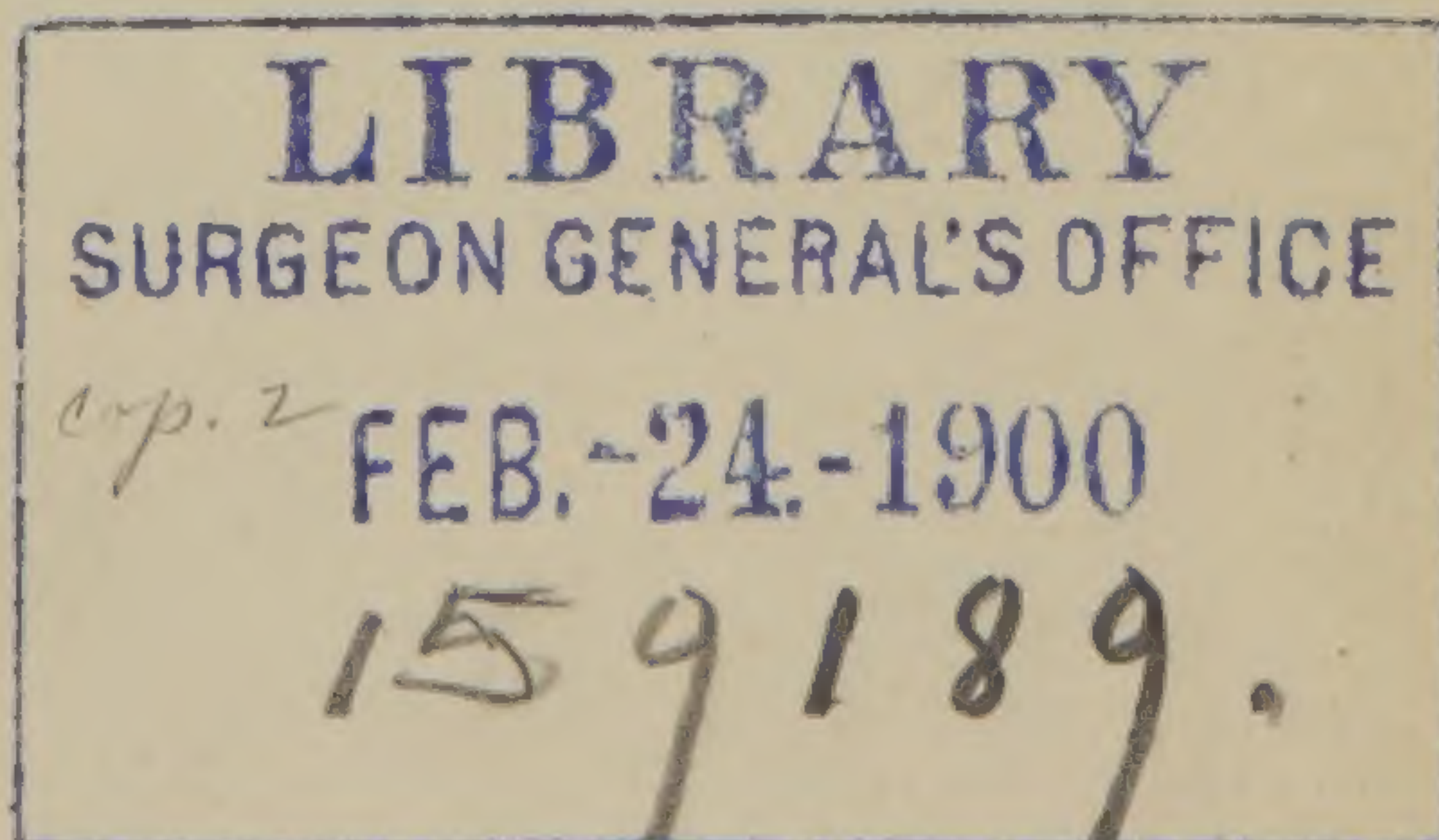
R. W. GARRETT, M.A., M.D.,

PROFESSOR OF OBSTETRICS AND GYNÆCOLOGY IN THE MEDICAL FACULTY,
QUEEN'S UNIVERSITY, KINGSTON; GYNÆCOLOGIST TO THE
KINGSTON GENERAL HOSPITAL.

CONTAINING OVER ONE HUNDRED ILLUSTRATIONS.

KINGSTON, ONT.

1897.



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TO
FIFE FOWLER,

PROFESSOR OF THE PRINCIPLES AND PRACTICE OF MEDICINE, AND
DEAN OF THE MEDICAL FACULTY IN QUEEN'S
UNIVERSITY, KINGSTON,

THIS BOOK IS RESPECTFULLY DEDICATED BY

THE AUTHOR,

IN RECOGNITION OF LIFE LONG SERVICES AS A PIONEER AND
STEADFAST LABORER IN THE CAUSE OF HIGHER
MEDICAL EDUCATION IN CANADA.

PREFACE.

During the many years the author has been engaged in teaching in various departments of medicine, it always appeared that much valuable time was lost to the student, and important points missed, in efforts to secure such notes as would furnish him with a knowledge of the teachings of the lecturer.

When it is demanded of a teacher to so arrange his lectures that his listeners may secure the required notes, his efforts are apt to become dry and uninteresting, and often simply a species of dictation.

In the opinion of the author, lectures, to be interesting, instructive, and impressive, should assume more the form of demonstrations, than set lectures, during which important features might be made plain, knotty questions discussed, obscure points elucidated, and methods for medical and surgical treatment made clear by the aid of blackboard drawings, maps, plates, and morbid specimens, leaving the intervening material for study elsewhere.

The large and excellent text books on the market are, as a rule, too cumbersome to carry backwards and forwards to class, and in order that the student might have a convenient text book for such a purpose, and in which he might note important points dwelt upon, and in order that the lecturer might feel he was free to demonstrate the subject as seemed best, without being confined to set lectures, it occurred to the author to place his extended notes in the form of a text book of such proportions as would not be cumbersome, and yet sufficiently comprehensive as to fully cover the subject. By such means it is hoped to make class attendance less burdensome or

PREFACE.

irksome, the material imparted more instructive, and lessen the time required by students in securing an accurate knowledge of the subject.

While undertaking the task, acknowledged by the author to be a difficult one, it occurred to him that by extending the notes a little further the work might become a useful adjunct to the general practitioner, whose busy life prevents him securing on all occasions the time necessary for consulting larger works. For such, however, it is not intended as a work for extended research, but from its method of compilation, and from its extensive index, it is hoped that it will serve as a means for ready reference, as well as an index to the many large and excellent works on the subject.

With these objects in view, the author has endeavored to place the subject in as plain and simple a manner as possible, preferring simplicity of expression to the adornment of language. Each subdivision has been briefly described, doubtful points, or subjects open to discussion, discarded, and only such treatment recommended as has stood the test of experience, believing it better to be armed with a few reliable methods of treatment than surrounded by a wilderness of uncertainty.

In the method of arranging the various subdivisions, the author has followed that adopted by Garrigue in his excellent work, feeling confident that regional classification is simpler at least than a pathological one.

In the description of diseases, or of surgical methods adopted for their relief, names of individuals have, as far as possible, been avoided, as being often misleading.

While expressing his own convictions, the author has endeavored to interweave into the pages of the work the opinions of those who represent the most recent and advanced thought, and of those who have been separated out for distinction in the subjects upon which they have written.

PREFACE.

Marginal references and foot notes have been avoided, because a knowledge of the source of the literature that has been incorporated is of no advantage to the student until he has mastered the rudiments of the science, and the practitioner can find in the large works of reference all the historical or other facts which he may seek.

Acknowledgment of valuable information is due to the following sources:—*Diseases of Women*, Garrigue; *Medical and Surgical Gynecology*, Pozzi; *Diseases of Women*, Thomas and Munde; *American Text Book of Gynecology*, Baldy; *Clinical Gynecology*, Keating and Coe; *A System of Medicine*, Allbutt and Playfair, Vol. II; *Diseases of Women*, Lawson Tait; *Manual of Gynecology*, H. T. Byford; *Manual of Gynecology*, Hart and Barbour, *Surgical Diseases of the Ovaries and Fallopian Tubes*, Bland Sutton; *Text Book of Abdominal Surgery*, Keith; *Abdominal Surgery*, Greig Smith; *Diseases of Women*, Skene; *Female Pelvic Organs*, Savage; *System of Surgery*, Dennis; *American Text Book of Surgery*; *Practice of Medicine*, Osler; *American Text Book of Obstetrics*; *Surgical Pathology and Morbid Anatomy*, Bowlby; *Electricity in Diseases of Women*, Massey; *Aseptic Surgical Technique*, Hunter Robb; *Manual of Surgical Asepsis*, Carl Beck; *Principles of Bacteriology*, Abbott.

In conclusion, the author wishes to acknowledge his indebtedness to Dr. W. T. Connell for valuable assistance in the preparation of the work, and to E. J. Barker Pense, proprietor of the British Whig, for the facilities offered, and the generous interest shown by him while the work was passing through the press.

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September, 1897.

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Medical and Surgical Gynæcology.

PART ONE.

PRINCIPLES OF GYNÆCOLOGY.

CHAPTER I.

INTRODUCTORY.

The term *Gynæcology* is understood to designate the affections of the genital organs in the female sex other than those immediately connected with pregnancy, childbirth, and the puerperal state, but clinically it is difficult to disassociate the one from the other, as the accidents and diseases arising during that critical period are the most fruitful sources of diseases peculiar to women.

Great progress has been made in every domain of medicine. Every branch of it has felt the new impulse, but in no department has it been so marked as in this one.

In tracing the development of modern gynæcology it is difficult to keep pace with, or even estimate the rapid progress it has made. Twenty years ago it was a mere appendage to obstetrics, the teaching of it being limited to a few lectures at the end of the session; to-day it is one of the most honored chairs in every medical curriculum. The teachings and practice of to-day bring hope and comfort to many a home which in days gone by would have been the possessor of a wife or mother or daughter doomed to hopeless invalidism under the label of "weak spine," "spinal irritation," "chronic ovaritis," "cellulitis," "irritable womb," and the like.

Through its advances there has been given to surgery the operation for the removal of pelvic tumors, and to-day ovarian cysts are removed with a mortality far below any other capital operation. The ingenious position of Trendelenberg has rendered easy the total extirpation of uterine fibroids; the pathology and operative treatment of extra-uterine pregnancy to-day snatches women from what then would have been considered the very jaws of death.

Vesico-vaginal and recto-vaginal fistulæ yield readily to operation and permanent relief can with almost certainty be promised. Uterine cancer, the presence of which until very recently signed the death-warrant of the sufferer, is now treated with such good results as to far surpass the most sanguine expectations, offering at least an increased term of life and sometimes the total eradication of the disease. Chronic endometritis, once so intractable, now readily yields to the use of the curette.

To gynæcology is due many of the advances in general surgery. From it has sprung the scientific treatment of appendicitis, the surgery of the kidneys and gall-bladder, as well as that of all intestinal and visceral lesions.

While recounting the triumphs recorded, it must always be a pleasant task to acknowledge the deep debt of gratitude which gynæcology owes to Sir Joseph Lister, for without his scientific discoveries and brilliant teaching, the successes of modern pelvic and abdominal surgery could never have been won, and the announcement made that he has been raised to the peerage, has been received with the most lively feeling of satisfaction throughout the medical profession, which is proud to recognise him among its members and on which he has already shed so much lustre.

While recognising that pregnancy and child-birth are fruitful sources of diseases in women, it is not by any means the greatest source. It is, therefore, the duty of every student of the subject not to be content with a

knowledge of the actual existence of disease, but to study out the etiological factors and the methods by which they may be ameliorated, lessened, or prevented.

A large factor may be found in faulty education. The chief strain of reproducing falls upon woman. She bears the burden of gestation, parturition, lactation, and of maternity, and for this great end she needs the most perfect physical development. The growth and well-being of her body should, therefore, be as carefully looked after as the growth and well-being of her mind, a *concordat* in female education not sufficiently maintained. During girlhood days too much time is spent in the school-room, or in poring over books at home, when she should be at play. Just as womanhood is asserting itself, come the competitive examinations, which select the brightest and most intellectual, and who are often the most delicately constructed, for promotion to the high schools and universities. Two to four or even five years, most precious years for them, years needful for the perfect development of not only their general health but for the development of the reproductive organs and for the establishment of their functions, are spent in antagonism between brain growth and body growth. Possibly after leaving school, the worn out, rest-needing girl launches into the married state, and this young girl, wilting under the double strain of wifehood and motherhood, remains ever after an invalid with her uterine and ovarian diseases, or with nerve prostration and its protean mimicry of uterine symptoms.

Undoubtedly some of the worst forms of disease arise from specific infection by husbands, giving rise to sterility, miscarriage, oophoritis and salpingitis of every kind and degree, pelvic and intestinal adhesions, chronic ill-health, and even death.

Probably the most common of all causes is the prevention of conception. By the methods adopted so much

engorgement and hyperplasia and disorganization of the uterine structures and appendages are apt to take place, that their health breaks down and they become comparative invalids. It is well to remember, when considering such important factors, that history does not forget to repeat itself. In the time of Julius Cæsar, celibacy and childlessness became more and more common; criminal abortion was frequently practised; pregnancy was considered a mar to beauty, and the Roman empire, for the want of *men*, was overrun by northern hordes. Greece, once the pride of the world, at last quailed before the Roman Eagle and became a vassal because she could not brook to have her classic tastes interrupted by family cares and family ties.

It cannot but be recognised that those who are the guardians of the public health are the guardians of the nation's prosperity and greatness, and this is doubly true in the case of the health of women who are to become the mothers of our future men, for unless their health and strength and well-being are preserved, the brain and bone and sinew of the country will, by progressive decadence, dwindle towards extinction.

CHAPTER II.

DEVELOPMENT OF THE FEMALE GENITALS.

For a proper understanding of the malformations and diseases of the female genitals, it is necessary to be able to trace the various steps in their development.

The **Wolffian Ducts** are the first organs belonging to the genital sphere to appear. There is one on either side of the body and is situated between the proto-vertebral column and the lateral plates. Originally it is a solid cylindrical cell mass, but later becomes tunnelled. The upper end connects with the Wolffian body, the lower end

opens into that part of the allantois situated in the body of the embryo and communicates with the cloaca. In the female the Wolffian duct disappears more or less completely, remnants only of it being found in the broad ligaments.

The Wolffian Bodies are two long prismatic bodies, one on either side of the median line, and appear shortly after the Wolffian ducts. The lower end is fastened to the inguinal region by a ligament, which in course of time becomes the round ligament of the uterus. These bodies originate from the mesothelial lining of the body cavity, and form at first a row of pear-shaped bodies. Later they separate from it, acquire a lumen and form a row of vesicles, each of which soon connects with the Wolffian duct by absorption of the tissue between their cavities and the bore of the duct. In the female the Wolffian body is transformed into *Rosenmüller's organ* or the *parovarium* and stray tubes found between the parovarium and the uterus.

The Ovaries. The sexual glands are situated on the inner side of the Wolffian body, to which they are fastened by a fold of peritoneum, the *mesovarium*. The lower end is fastened to the Wolffian duct by a ligament which later becomes the *ligament of the ovary*. The blood vessels enter originally at the upper end of the mesovarium enclosed in a fold of peritoneum, which in time becomes the *infundibulo-pelvic* ligament. To the outer side of the mesovarium is attached the *mesosalpinx* or *mesentery* of the tube which later is called the *ala vespertilionis* (bat's wing), and contains the remnants of the Wolffian body, particularly the parovarium. The ovaries are also subject to descent. At birth they are above the ilio-pectineal line, and descend into the pelvis during the first two or three months of extra-uterine life.

The Mullerian Ducts appear soon after the Wolffian body as an extended ridge of thickened mesothelium along

the outer side of the upper end of the Wolffian body. The lower part is at first formed by a solid column of cells which later becomes tunnelled so as to form a tube. They form in the female the Fallopian tubes, the uterus, and vagina.



FIG. 1.—MULLER'S DUCTS.

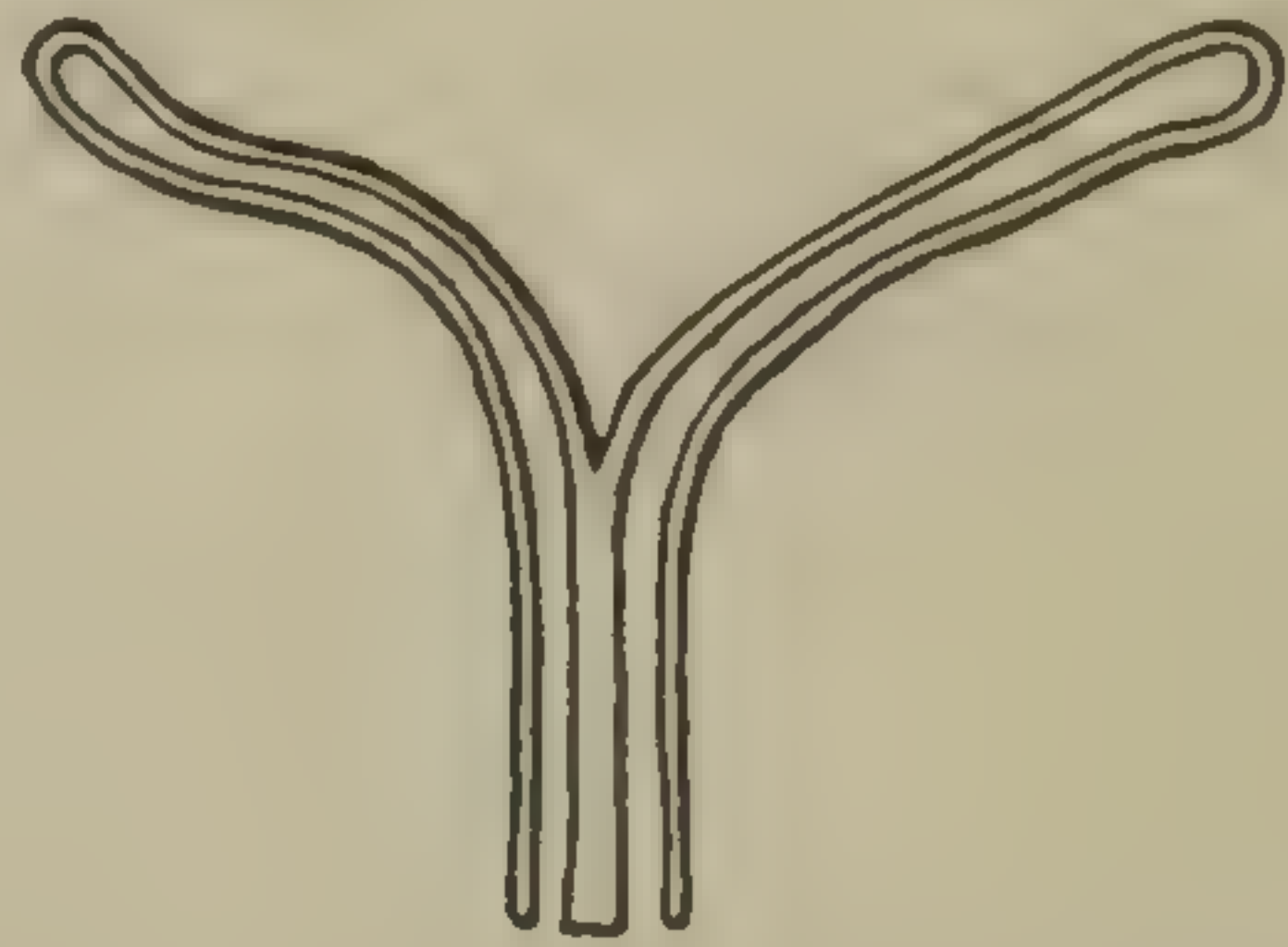


FIG. 2.—COALESCENCE OF DUCTS.

The Fallopian Tubes are formed of that part of the Mullerian ducts which lies above the round ligament of the Wolffian body. The cells of the wall form the fibrous muscular and mucous coats of the fully developed tube, and fringes forming the *fimbriae* grow out around the abdominal opening.

Uterus and Vagina. The part of the Mullerian ducts below the round ligament, together with the lower end of the Wolffian ducts, forms a quadrangular cord called the *genital cord*. The walls between the Mullerian ducts are absorbed and thus but one canal is formed. The genital cord is further developed so as to form the uterus above and the vagina below. While the fusion of the Mullerian ducts is incomplete they are separated above, forming the two *cornua* of the uterus, but later form but one sac without horns. The Mullerian ducts open into the lower part of the *urachus*—that part of the allantois which is included in the body—and later forms the bladder. This lower part, situated below the openings of the Mullerian and Wolffian ducts is called the *uro-genital sinus*. Originally this sinus opens into the *cloaca*, but later the septum is formed, dividing the cloaca and thereby separating the uro-genital sinus from the rectum and the uro-genital opening from the anus, thus forming the perineum.

The Urethra is differentiated as a special organ from the bladder, with which it heretofore formed one sac called the urachus. The uro-genital sinus which seemed to be the continuation of the bladder, now appears as the continuation of the vagina and forms the *vestibule*. The vagina is next separated from the uterus by the formation of a ring and about the same time the cervix is being

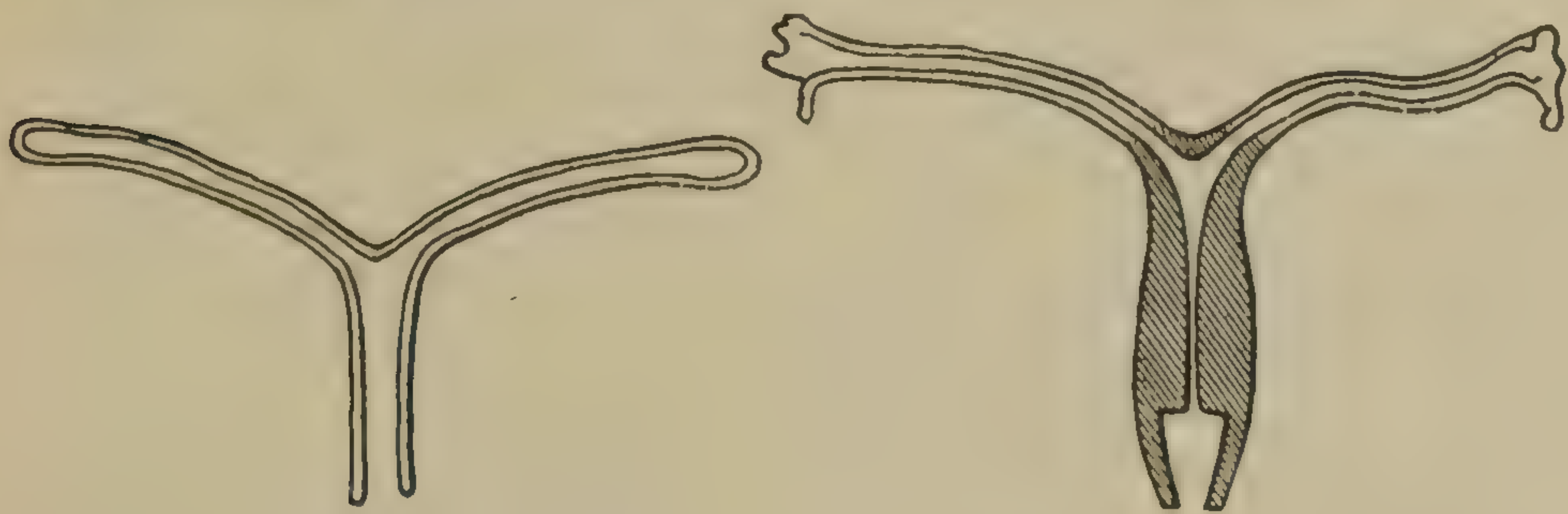


FIG. 3.—DISAPPEARANCE OF SEPTUM.

FIG. 4.—APPEARANCE OF FUNDUS AND CERVIX.

distinguished from the body of the uterus. The vagina becomes much wider, its *columns* and *rugæ* make their appearance, and later the *hymen* is formed by a development of the posterior wall of the vagina.

The Vulva. Originally the uro-genital and digestive tracts open into one common cavity, the *cloaca*. The cloaca opens on the surface of the body by a slit called the cloacal opening. In front of this opening appears an elevation called the *genital tubercle*, surrounded by two folds called the *genital folds*. A groove is formed on the lower surface of the genital tubercle, called the *genital furrow*. The genital tubercle becomes the clitoris; the genital folds, the *labia majora*; the edges of the genital fold, the *labia minora*, a fold of which surrounds the clitoris forming the prepuce. The separation between the uro-genital sinus and the rectum is completed; the genital folds grow together at their posterior end and unite with the partition or septum between the uro-genital sinus and the rectum to form the perineum.

CHAPTER III.

ANATOMY.

THE PELVIS.

Four bones, two *ossa innominata*, the *sacrum*, and the *coccyx* take part in the formation of the pelvis. The pieces comprising the innominate bone—the *ilium*, *ischium*, and *pubis*—in early life are distinct, but later are fused into one. The space included within these bony walls is divided into two parts, the part above the ilio-pectineal line is called the *false pelvis*, and that part below, the *true pelvis*. The true pelvis is a short curved canal, whose superior *strait*, *inlet* or *brim* is bounded behind by the promontory of the sacrum, laterally by the ilio-pectineal lines, and in front by the upper margin of the pubis. The *inferior strait* or *outlet* is bounded behind by the tip of the coccyx, laterally by the tuber-ischii, and in front by the lower border of the pubic bones.

The *plane* of the inlet, when the body is in an erect position, forms with the horizontal an angle of about forty-five degrees. The *axis of the inlet* if directed upward would pass through the umbilicus, and if prolonged downward would touch the tip of the coccyx. The *axis of the outlet* if extended upward would meet the promontory of the sacrum. The bones are united with one another by four articulations, one in front between the two pubic bones, the *symphysis pubis*; two laterally between the lateral surface of the sacrum and ilium, the *sacro-iliac*; and one behind between the sacrum and coccyx, the *sacro-coccygeal*. In addition to the ligaments which bind these bones together, there are two important ones closely associated with the boundary of the true pelvis—the *greater* and *lesser sacro-sciatic* ligaments.

THE FEMALE ORGANS OF GENERATION.

The Genital Organs are divided into two groups: the *external* to which belong the *mons veneris*, the *vulva* and the *vagina*; and the *internal* to which belong the *uterus*, the *Fallopian tubes*, and the *ovaries*.



FIG. 5.—Virginal Vulva: 1, labia majora; 2, fourchette; 3, labia minora; 4, glans clitoridis; 5, meatus urinarius; 6, vestibule; 7, entrance to the vagina; 8, hymen; 9, orifice of Bartholin's gland; 10, anterior commissure of labia majora; 11, anus; 12, blind recess; 13, fossa navicularis; 14, body of clitoris.

The **Mons Veneris** lies in front of the pubic bones just below the hypogastric region. It is composed of stout integument, abundantly supplied with crisp hair and a thick cushion of subcutaneous adipose and areolar tissue. The hair is limited above and does not extend to the umbilicus as in man.

The **Vulva** forms and surrounds the entrance to the genital canal. It is made up of the *labia majora*, with the *fourchette*; the *labia minora* with the *clitoris*; the *vestibule* with the *bulbs*; the *fossa navicularis*; and the *vulvo-vaginal glands*.

The **Labia Majora** are two conspicuous longitudinal folds

of integument, one on either side of the median line, extending from the mons veneris to within about an inch in front of the anus. The outer surface is covered with pigmented epidermis and scattered hairs; the inner surface is smooth, rose-coloured, more delicate in texture, and where least exposed partakes of the character of a mucous membrane. The point at which they unite in front is called the *anterior commissure*, and behind the *posterior*

commissure. Immediately within the posterior commissure, a crescentic fold extends transversely, the *fourchette*. The space between the fourchette and the posterior commissure is the *fossa navicularis*. Each labium includes within it areolar tissue, unstriped muscle fibre, and considerable fat, and together are the homologues of the scrotum in the male.

The Labia Minora or Nymphæ are two thin diverging folds of delicate skin on the inner side of the labia majora. Just before meeting in front, each divides into two leaflets, the outer or upper leaflet of each passing over the clitoris to unite and form the *prepuce*; the inner or lower leaflet passing beneath to form the *frenum*. They extend back to about half way between the clitoris and the posterior commissure, gradually merging into the sides of the vaginal orifice.

The Clitoris is a small cylindrical body about an inch long situated in the median line below the anterior commissure. It is composed of the *glans*, a pointed tubercle which forms the end and is the only part visible, and the *body* which consists of two distinct *corpora cavernosa* attached to the symphysis by the suspensory ligament and by their crura to the rami of the pubes. It is supplied with erectile and muscular tissue, in diminutive similar to that of the male, and has a prepuce and frenum formed by the labia minora. The *blood supply* comes from the internal pudic, the same as in the male, and the *lymphatics* empty into the inguinal glands.

The Vestibule includes the triangular space between the clitoris, the labia minora, and the entrance to the vagina. Its smooth mucous surface is broken in the midline about one inch behind the clitoris, by the urethral opening or *meatus urinarius*.

The Vestibulo-vaginal Bulbs are two leech-shaped organs, one on either side of the vestibule and together are equivalent to the bulb in the male urethra.

The Vulvo-vaginal or Bartholin's Glands are two small round or oval bodies situated on either side of the entrance to the vagina at the posterior end of the vestibulo-vaginal bulbs. They are racemose glands, secreting a mucous fluid.



FIG. 6.—Shape and relative length of vaginal walls.

der and urethra in front and with the rectum behind. The *axis* while corresponding in general with that of the pelvic cavity, presents a double or S-like curvature. When not distended it is folded, the anterior and posterior walls being in contact so that in cross section it resembles in shape the letter "H." When distended it is in the form of a truncated cone, the apex at the vulva. The lower end dips into the vulva by a circular opening surrounded by the *constrictor vaginae* muscle. The upper end forms a cup to receive the vaginal portion of the uterus, and in its adaptation to the parts forms a shallow pouch in front and behind, the *anterior*

The Vagina is a musculo-membranous canal lying chiefly within the cavity of the pelvis and extending between the vulva and the uterus. It pierces the pelvic floor at its lower end and is in relation with the blad-

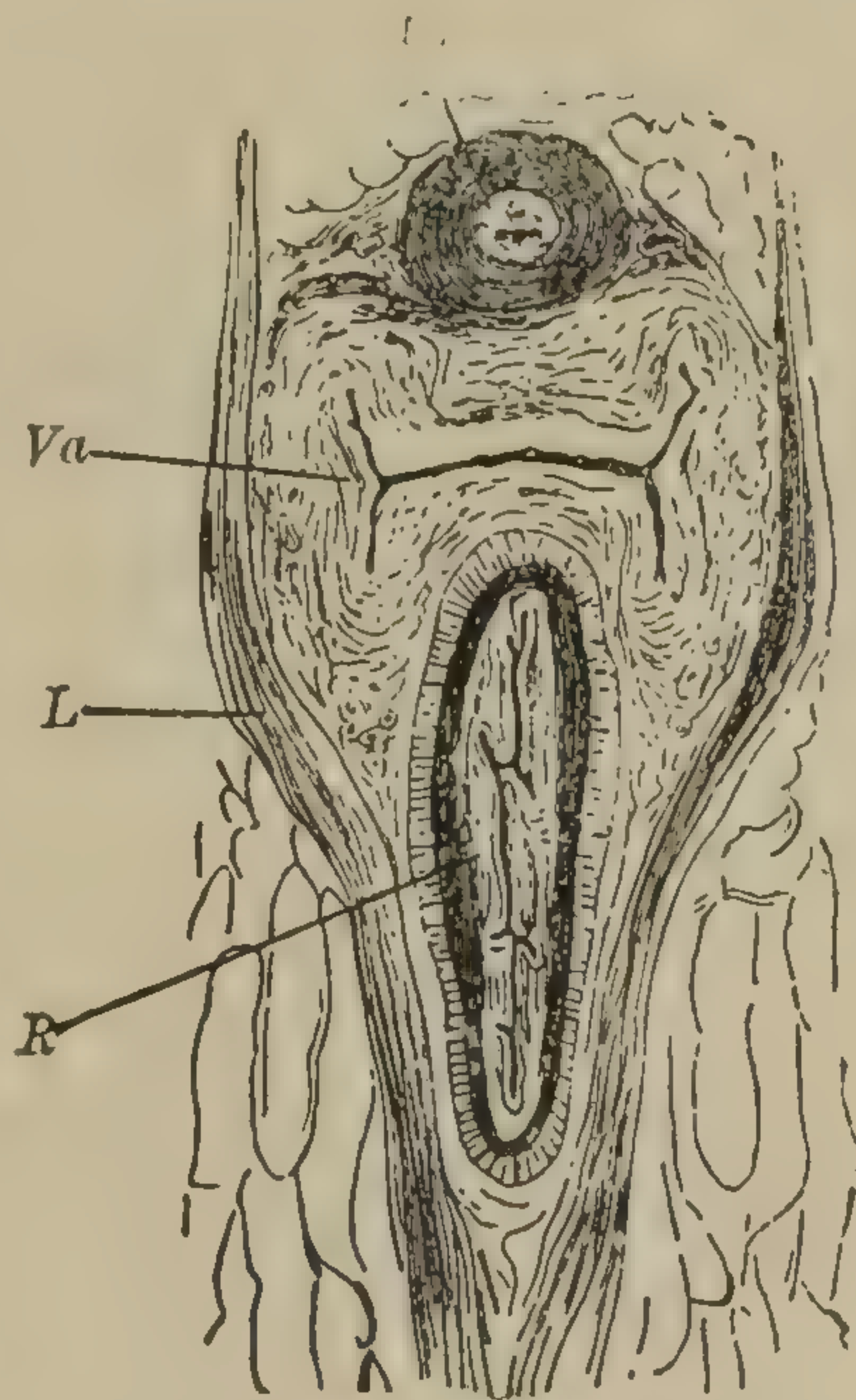


FIG. 7.—Horizontal Section of the Soft Parts in the Inferior Strait of the Pelvis (Henle); *Va*, vagina; *Ur*, urethra; *R*, rectum; *L*, levator ani.

and *posterior fornices*. In the adult virgin the anterior wall is about two and a half inches long and the posterior about three and a half inches, but after child-birth these dimensions are increased.

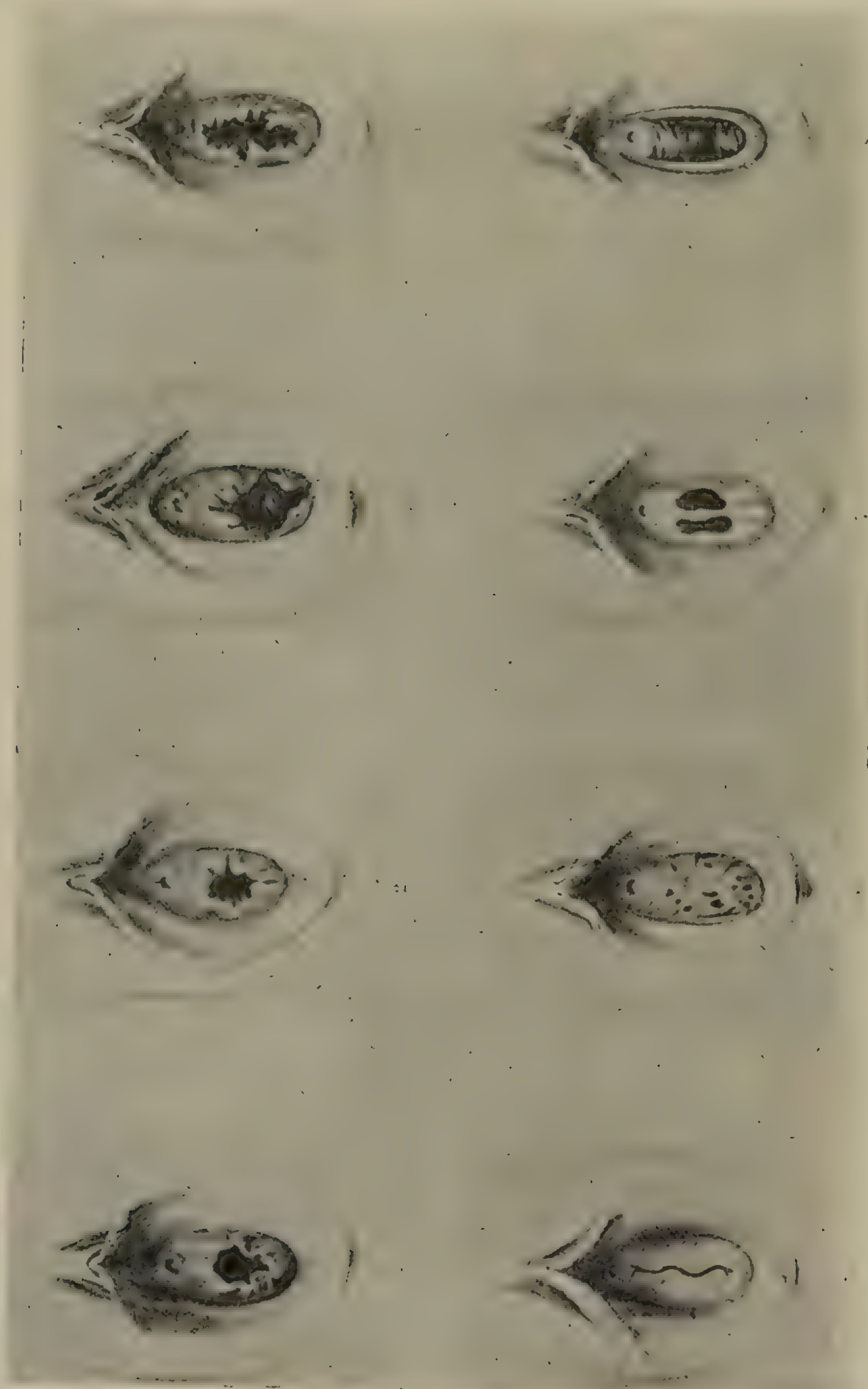


FIG. 8.—VARIETIES OF HYMEN: Virgin hymen, 1, commonest form (annular); 2, hymen after coitus; 3, after delivery; 4, fimbriate hymen; 5, hymen with narrow slit; 6, cribriform hymen; 7, hymen with septum; 8, horseshoe form.

In *structure* the walls of the vagina consist of a *mucous* membrane, covered by stratified squamous epithelium and possessing numerous papillæ; a *muscular* layer made up of longitudinal and circular fibres; and a *fibrous* tunic of rich fibro-elastic tissue derived from a prolongation of the recto-vesical fascia. The mucous membrane of the anterior wall is thrown into folds or *rugæ* and a less distinct formation is found on the posterior wall. They are called the *anterior* and *posterior columns*.

The *blood supply* is derived from the vaginal, uterine, vesical, and internal pudic arteries. The *lymphatics* from the lower fourth join the lymphatics of the external genital organs and end in the superficial inguinal glands. The lymphatics of the upper portion proceed outward with the broad ligament and joining with those from the oviduct and ovaries terminate in the lumbar glands. The *nerves* are derived from the inferior hypogastric plexus of the sympathetic and from the fourth sacral and pudic nerves.

The Hymen is a fold of mucous membrane which closes more or less completely the lower opening of the vagina. It varies much in *shape*, the most common being two lateral strips which touch one another in the middle line. Sometimes it forms a ring with a round opening, sometimes a crescent, and sometimes it is represented only by a low circular or crescentic ridge, and not unfrequently the border is indented, which condition is not to be confounded with a lacerated hymen. At coition the hymen is usually torn, but at first child-birth it is so destroyed as to leave only three or four roundish prominences called the *carunculæ myrtiformes*.

The Uterus is a hollow flattened pyriform muscular organ situated between the vagina below and the intestines above, and between the bladder in front and the rectum behind. It is about three inches long, one and a half inches at its greatest width, and one inch in thickness.

Of the entire organ, three-fifths belong to the upper part or *body* and two-fifths to the lower part or *neck*. The body is almost flat on its anterior surface but distinctly convex behind; the upper border is rounded and constitutes the *fundus*; the lateral borders are slightly convex and mark the attachment of the broad ligaments. The neck or *cervix*, spindle-shaped in its general outline, is divided into the *vaginal portion*, or that part which projects down into the vagina, and the *supravaginal portion*. The vaginal portion is covered with *squamous*

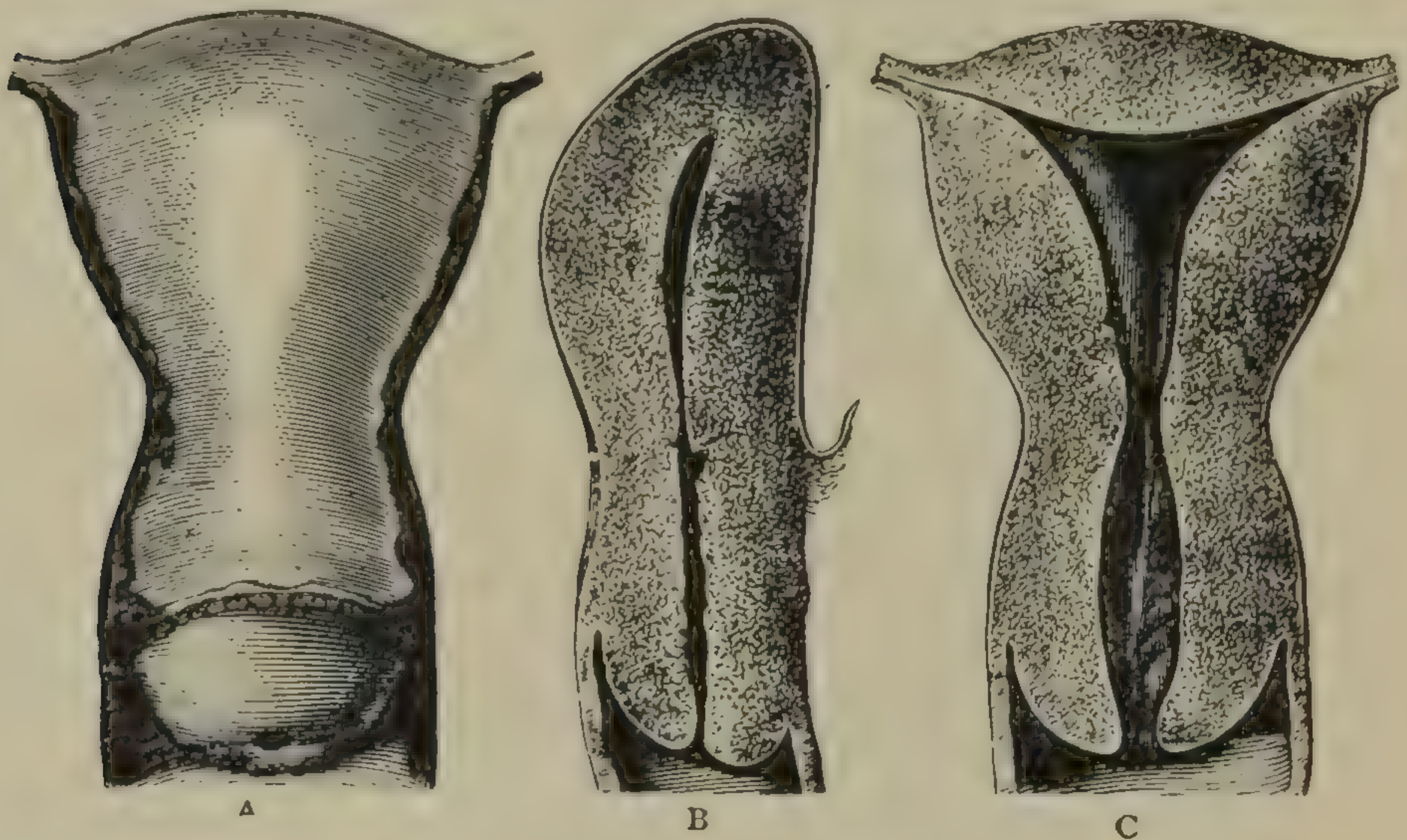


FIG. 9.—VIRGIN UTERUS.
A. Anterior view. B. Median section. C. Lateral section.

epithelium, the same as covers the mucous membrane of the vagina, and at its lower end is a transverse or rounded opening, the *os externum* or *os uteri*. That portion of the cervix in front of the os forms the *anterior lip*, and that behind the *posterior lip*.

The interior of the uterus contains a cavity, the *uterine cavity*, about two and one-half inches long. That portion within the body is triangular in shape when viewed from in front, the expanded base extending between the orifices of the oviducts and the apex corresponding with the upper opening of the cervical canal, or *os internum*.

That portion within the cervix is fusiform in shape and on its anterior and posterior walls are found ridges separated by deep pouches which go outward and upward and form the *arbor vitae* or *palmae plicatae* of the uterus.

Structure. The uterine wall is about three-eighths of an inch thick and is composed of three layers, a mucous, a muscular, and a serous. The *mucosa* lines the whole cavity and consists of a *tunica-propria* covered by a layer

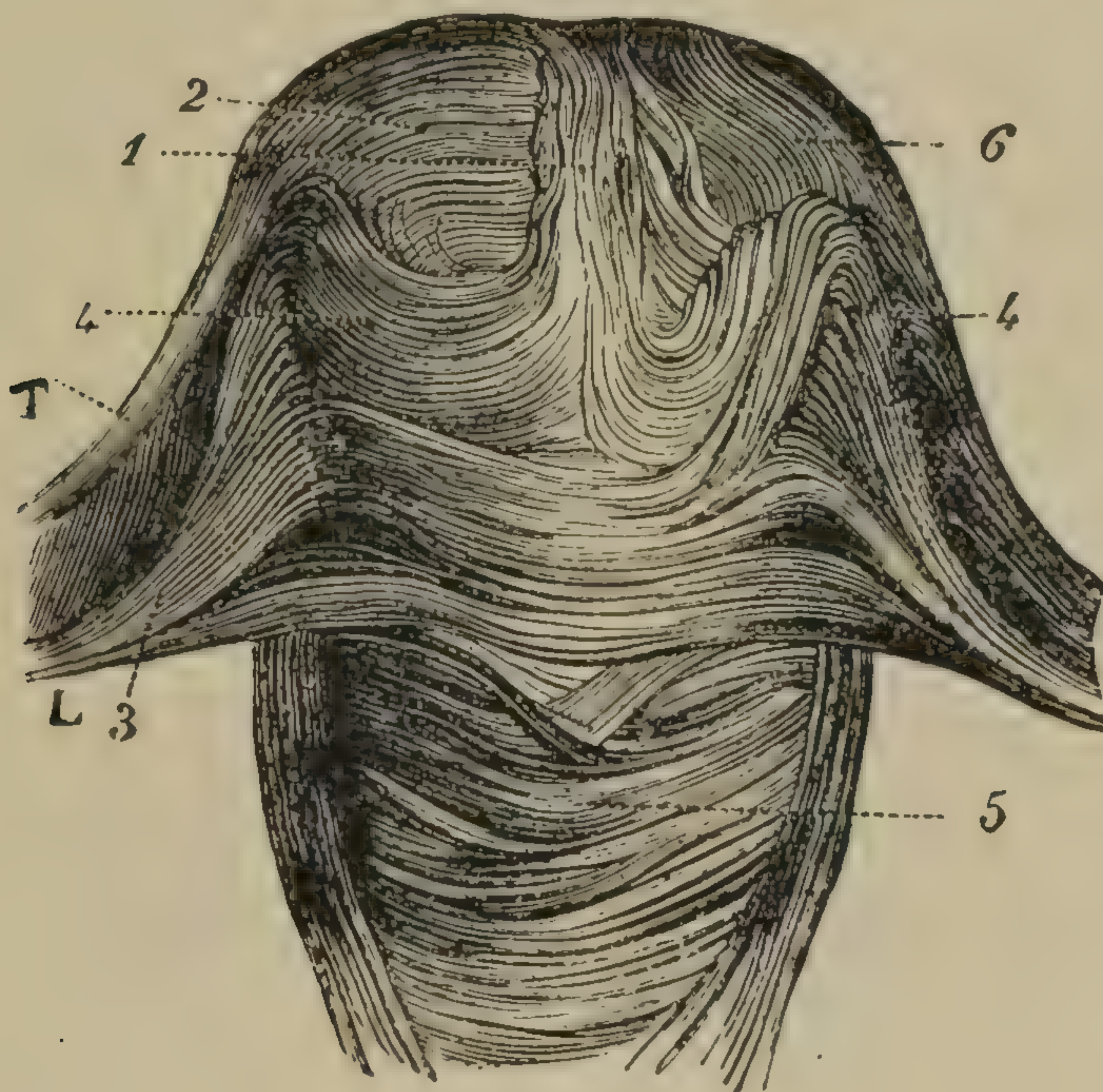


FIG. 10.—Anterior Surface of the Uterus, Superficial Layer. L, Round ligament; T, Tube; 1, middle layer; 2, transverse fibres; 3, fibres of the round ligament which have spread over the anterior surface of the uterus; 4, fibres arising from the posterior portion of the round ligament which form loose folds before they join the median fasciculus; 5, fibres of the cervix uteri; 6, oblique fibres.

of ciliated columnar cells. Numerous tubular depressions, the *utricular glands*, lined with ciliated epithelium are found in it. In the cervix the mucosa is thicker, and in addition to the tubular follicles, racemose glands lie within it. Its upper two-thirds is covered with ciliated columnar and its lower one-third with stratified squamous epithelium. The *muscular coat* is divided into three layers, an outer longitudinal which sends prolongations into the oviducts,

and the round, ovarian and sacro-uterine ligaments; a middle layer of interlacing longitudinal and circular fibres, which are in connection with the muscular coat of the vagina; and an internal transverse layer, the lower portion of which is especially developed to form a sort of sphincter at the os internum. The *serous coat* is formed by the usual constituents of the peritoneum.

Position. The exact position of the uterus in the living subject is a much discussed question. It may be

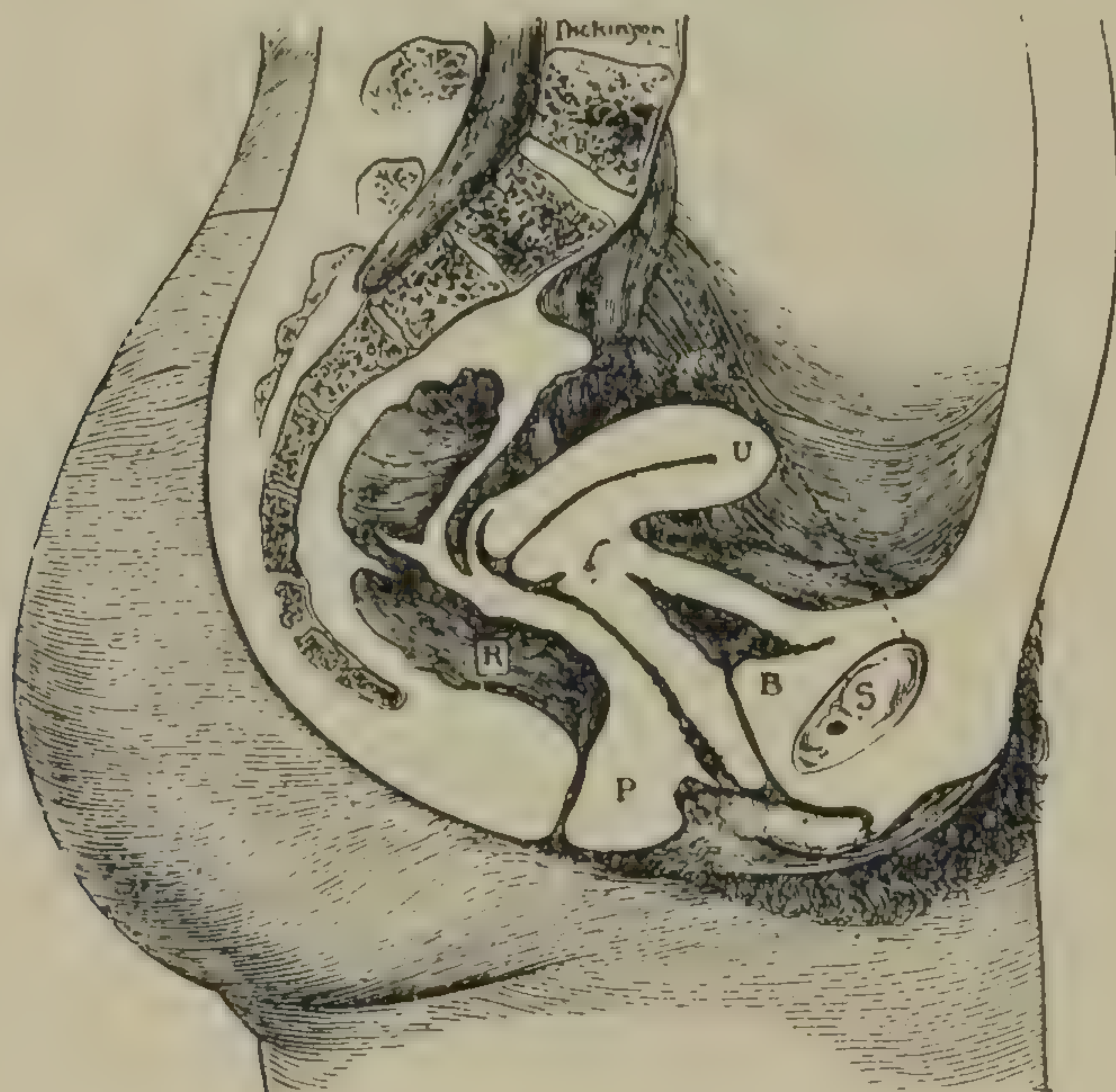


FIG. 11.—Diagrammatic sagittal section of the female pelvis. U, uterus; R, rectum; S, symphysis; P, perineal body; B, is beneath bladder. This is the position of the uterus when the bladder is almost empty.

said that the fundus reaches a little above the brim of the pelvis and lies a little to the right side. With the rectum and bladder empty, the longitudinal axis of the uterus forms a right or obtuse angle with that of the vagina.

The **Supporting Apparatus** of the uterus consists of eight ligaments composed of folds of peritoneum or muscular bands or of both passing from the uterus. The *vesico-uterine* are two small semilunar folds of peritoneum,

one on either side of the median line and passing from the bladder to the uterus on a level with the internal os.

The *sacro-uterine* are folds of peritoneum passing from the cervix to become continuous with the serous covering of the second portion of the rectum. They form the lateral boundaries of *Douglas' pouch*. Between its layers unstriated muscle fibres derived from the outer layer of the uterus extend from the upper part of the cervix to the second sacral vertebra.

The *lateral* or broad ligaments are two wide duplicatures of peritoneum, one on either side, extending from the side of the uterus to the pelvic wall, forming a partition between the anterior and posterior pouches. Each presents four borders. The *superior* or free border encloses the oviduct as far as its fimbriated end and then diverges towards the pelvic wall to form the *infundibulo-pelvic* ligament. The *inferior* border is attached below to the recto-vesical fascia and to a mass of connective tissue lying at the side of the cervix, called the *parametrium* or *parametric* connective tissue. The *internal* border is attached to the side of the uterus, and the *external* border to the side of the pelvic wall where it is continuous with the obturator fascia. This ligament has two layers, an anterior which covers the round ligament, and a posterior in which there is an opening for the insertion of the ovary. Between the layers are found the blood vessels, nerves and lymphatics, together with the *parovarium*, the *paroophoron*, and unstriated muscle fibres which pass from the uterus to the pelvic wall.

The *round ligaments*, one on each side, are attached to the upper segment of the uterus, below and in front of the oviducts. Each proceeds in a curved direction, first upward and outward, then inward and forward to the internal inguinal ring, through which it passes. After traversing the inguinal canal it emerges at the external inguinal ring to blend with the tissues of the labium

majus. The ligament consists of bundles of connective tissue and unstriated muscle fibre derived from the uterus. It at first runs under the anterior layer of the broad ligament, but afterwards has a peritoneal covering of its own which, as a rule, stops at the inner ring. Occasionally the pouch of peritoneum accompanies it through the ring, forming the *canal of Nuck*, corresponding to the processus vaginalis in the male.



FIG. 12.—Blood-vessels of the pelvis; the anterior part of the pelvis has been removed, and the bladder and the anterior vaginal wall have been partially cut away. The uterus is drawn up and the Fallopian tubes are displaced into the iliac fossæ.

Blood Supply. The uterine arteries derived from the internal iliac pass behind the peritoneum on the posterior wall of the pelvis down into the parametrium and form loops in front of the ureters a short distance from the antero-lateral fornices of the vagina. They then pass up between the two layers of the broad ligaments following

the edges of the uterus as far as the cornua, and in their course they send off at right angles branches to the uterus. At the internal os branches in front and behind form, by an anastomosis, the circular artery.



FIG. 13.—The ovarian, uterine and vaginal arteries.

The *lymphatics* commence in the endothelium, those from the cervix passing to the obturator glands, and those from the body to the internal iliac glands.

Nerve Supply. Branches from the second, third, and fourth sacral nerves join with branches from the hypogastric plexus to form a ganglion on either side of the

cervix. From this ganglion, branches are distributed to the uterus, vagina and bladder.

The Fallopian Tubes or Oviducts are two long slender tubes which extend from the superior angles of the uterus within and along the free margins of the broad ligaments for a distance of from three to five inches to the vicinity of the ovaries, where each terminates in a funnel-shaped orifice, the *infundibulum*.

Each tube is divided into three parts. The *isthmus* comprises about the inner third, and communicates with the uterus by the *ostium internum*, an opening so small as barely

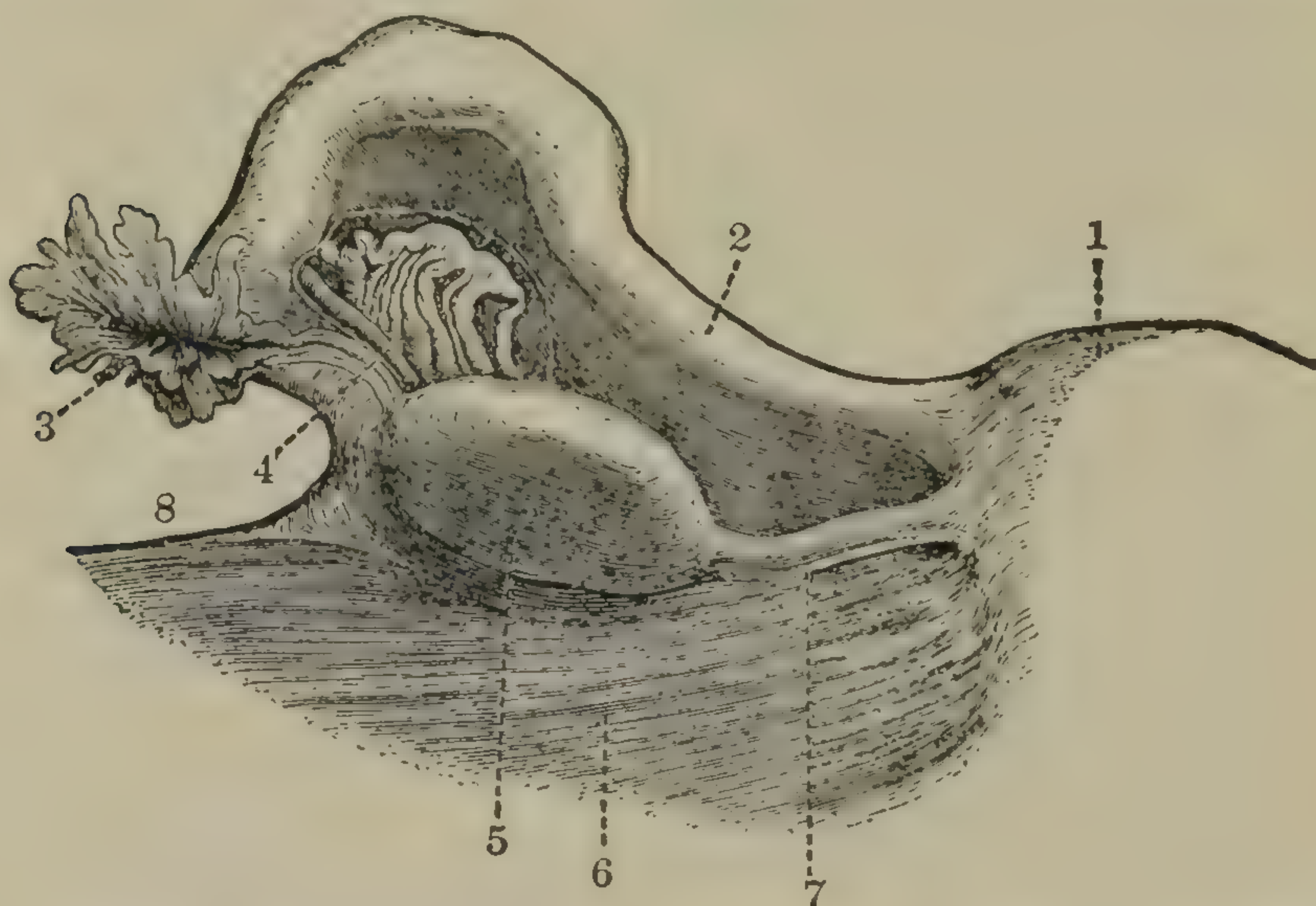


FIG. 14.—Posterior View of Left Uterine Appendages: 1, uterus; 2, Fallopian tube; 3, Fimbriated extremity and opening of the Fallopian tube; 4, parovarium; 5, ovary; 6, broad ligament; 7, ovarian ligament; 8, infundibulo-pelvic ligament.

to admit a bristle. The *ampulla* or middle part is twice as thick, curved, and follows a serpentine course. Its calibre will admit a uterine sound. The *fimbriæ* are the outermost part, and surround the outer end of the ampulla like a collar with long flaps. One of these, the *fimbria ovarica*, is attached to the free end of the ovary and forms a gutter. In the middle of the fimbriæ is the outer opening or *ostium abdominale*.

Structure. The oviducts are made up of three coats. The *mucous*, continuous with that of the uterus, presents numerous longitudinal folds which increase in size and complexity within the infundibulum, and is lined by a single layer of ciliated columnar epithelium. The *muscular* is made up of an inner circular and an outer longitudinal layer of unstriated muscle fibres continuous with the muscular coat of the uterus. The *serous* coat consists of the peritoneal investment contributed by the upper free margin of the broad ligament.

The Ovaries are two oval bodies situated by the side of the uterus, below, behind, and to the inner side of the oviducts. Each ovary appears as an appendage on the posterior surface of the broad ligament. The anterior border alone is attached, being inserted there in a hole, as it were, in the posterior layer. The arched posterior border and the broad surfaces are covered with hexagonal columnar epithelial cells, the *germinal epithelium*. The dimensions vary considerably with the individual but they usually measure one and one-half inches long, one inch wide, and half an inch thick. The smaller or lower end of the ovary or uterine pole points toward the uterus, to which it is united by a fibro-muscular band about one inch long, the *ovarian ligament*. The upper end or tubal pole after being embraced by the arching oviduct receives the lower border of the fimbriated extremity of the oviduct, and is further connected to the wall of the pelvis by the infundibulo-pelvic ligament through which the blood supply is conveyed to the ovary by means of the ovarian artery, a branch of the abdominal aorta.

Structure. The ovary is divided into an outer part, the *parenchymatous zone* or *cortex*, and an inner, the *vascular zone* or *medulla*. The cortex contains the *Graafian follicles*, and the *ova*, and occupies the outer one-third of the organ. The medulla embraces the remaining central portions of the organ into which the

blood vessels enter through the hilum. The bulk of the organ consists of peculiarly arranged connective tissue and of unstriped muscle fibre, the *ovarian stroma*, in which lie embedded the Graafian follicles. Beneath the germinal epithelium it forms a layer of greater density than the adjacent stroma, to which the name *tunica albuginea* is applied, but it is not an independent envelope. Under the albuginea is found a zone distinguished by the presence of small follicles containing an ovum, the so-called *ovisacs* or young Graafian follicles. Inside this zone is found another with much larger Graafian follicles. The medulla is composed of connective tissue and unstriped muscle fibre, but much looser in its arrangement, and in this the blood vessels are freely distributed. There are usually from six to twelve large follicles in an ovary and it is simply by their increased size that they seem to form a zone inside the smaller ones. In growing they push the surrounding tissues aside, extend deep into the interior of the ovary and at the same time come closer to the surface, until finally all tissue between the follicles and the surface is absorbed and they are then ready to burst.

The mature Graafian follicle appears as a clear elongated vesicle defined from the surrounding tissue by a condensed layer of ovarian stroma, the *theca folliculi*, which by some is described as composed of two layers, an outer of connective tissue, the *tunica fibrosa*, and an inner composed of cells and a fine net-work of vessels, the *tunica propria*. Within these are several layers of epithelial cells, the *membrana granulosa*, and on one side these cells form a protruding mass into the cavity called the *discus proliferus*. The follicle contains a fluid, the *liquor folliculi*. In the discus proliferus is embedded the ovum, about 0.3 m.m. in diameter, inside of which is found a fine membrane, the *zona pellucida*, or *vitelline membrane*. The interior is filled with a semi-fluid, the

vitellus, inside of which there is a small vesicle, the *germinal vesicle*, and within this is found a little round body, the *germinal spot*.

On the escape of the ovum the ruptured and partly collapsed follicle becomes filled with blood. Subsequent changes lead to the conversion of the follicle into a *corpus luteum*, the chief changes in which being produced by the ingrowth and rapid proliferation of the vascular tissue of the follicular wall. The history of the corpus luteum is naturally affected by the occurrence of pregnancy, instead of being almost entirely absorbed within a few weeks, when fertilization takes place it persists until the end of gestation. It is usual, therefore, to distinguish between the *corpus luteum* of *menstruation* and that of *pregnancy*. The mode of growth is identical in both, the stimulus of impregnation leading usually to excessive development.

The Parovarium or Organ of Rosenmuller, a remnant of the Wolffian body, is situated within the two layers of the broad ligament, between the outer end of the ovary and the oviduct. It consists of a series of from six to twelve spiral tubules, lying irregularly parallel, and made up of connective tissue, unstriped muscle fibre and columnar epithelium. Additional foetal remains in the form of rudimentary tubules are found within the broad ligament near the ovary and constitute the *paroophoron*.

URINARY ORGANS.

The Female Urethra is short, being only about one and one-half inches long, and lies beneath the symphysis pubis, firmly embedded within the anterior vaginal wall. It descends from the neck of the bladder in a slightly curved direction, the concavity being forward, to the vestibule, where it terminates in the *meatus urinarius*. It is surrounded by the *compressor urethrae* muscle and has a *sphincter* at the meatus. It is about a quarter of an

inch in diameter, but owing to the elastic character of its tissues is capable of great distension, a feature of much advantage in examination of the bladder.

The *mucous membrane* is covered with stratified transitional epithelium, and tubular glands occur near the vesical end. Two small tubes, *Skene's glands*, lie within the muscular wall and open into the urethra a short distance above the meatus.

The **Bladder** is placed between the pubic bones and the vagina and uterus. When empty it is situated in the true pelvis and is flattened or "Y" shaped; when distended it reaches more or less into the abdominal cavity and is ovoidal. The *base* or *fundus* is the lowest part of the organ and is connected to the anterior wall of the vagina and to the neck of the uterus by rather firm connective tissue. *Three openings* are found in it. In front is the internal opening of the urethra, and behind there are two fine lengthy slits, where the ureters open into the bladder. The triangular surface between these three openings is called the *trigone*. The anterior surface has no peritoneal covering and lies against the pubic bones. The posterior surface is covered with peritoneum down to the level of the internal os. It has three coats, a *serous*, derived from the peritoneum; a *muscular*, composed of an outer longitudinal, and an inner circular layer of unstriped muscle fibre; and a *mucous* coat which is thrown into folds when empty. This coat contains numerous *lacunæ* and *racemose glands*, and is covered with stratified transitional epithelium.

Ligaments. The bladder has four true ligaments, two *anterior*, running from the lower part of the pubis to the anterior surface, and two *lateral*, from the outer margins of the anterior ligaments to the sides of the bladder. The false ligaments, five in number, are folds of peritoneum. The two *posterior* are the *vesico-uterine* ligaments. The *lateral* extend from the iliac fossæ to the sides of the

bladder, and the *superior* extends from the summit of the bladder to the umbilicus.

The **Ureters** are two tubes leading from the kidneys to the bladder. They are from sixteen to eighteen inches long and about the size of a goose quill. Starting at the pelvis of the kidney, they run down parallel with each other to the brim of the pelvis and there crossing the iliac vessels slightly below the division of the common iliac

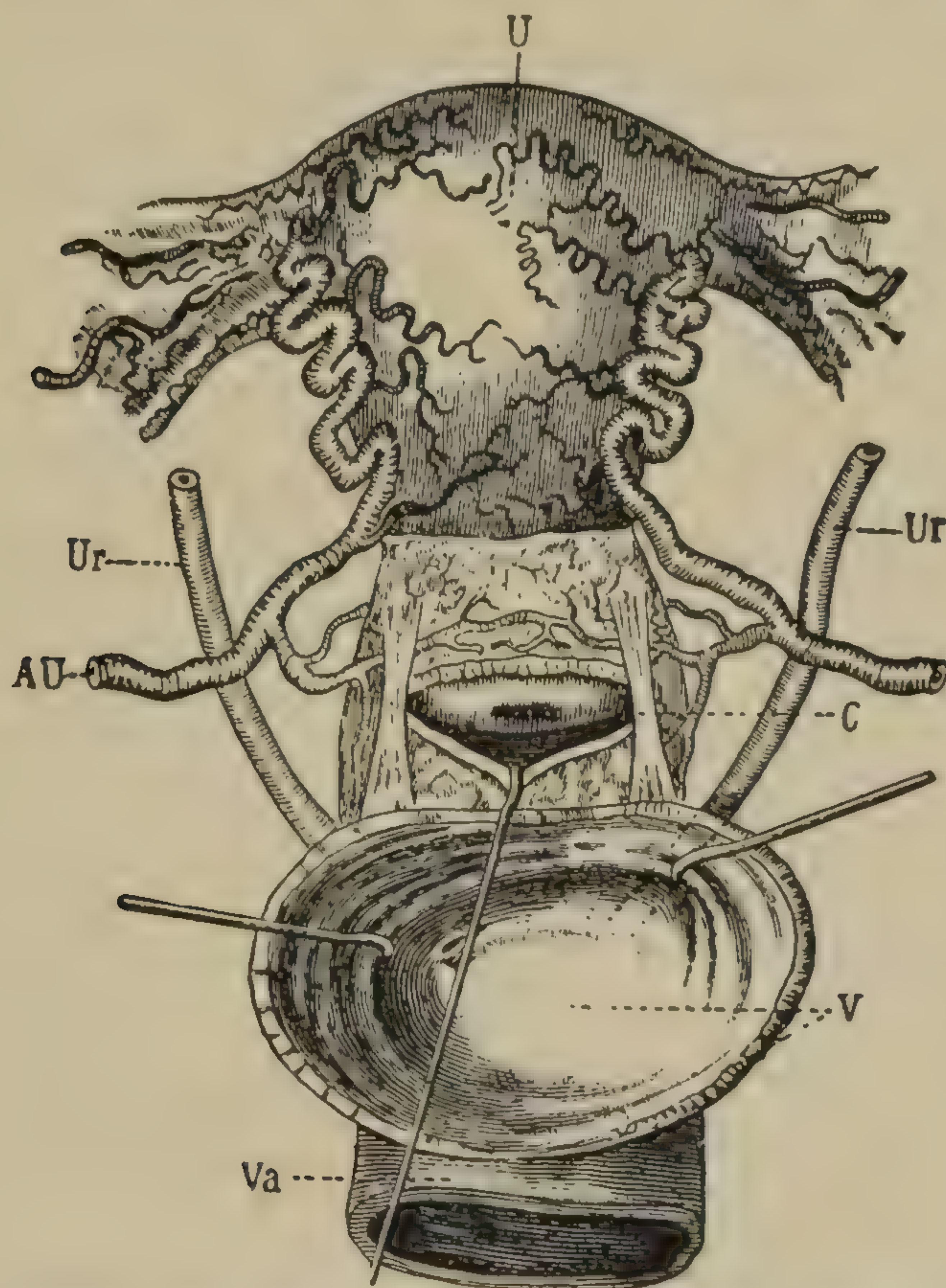


FIG. 15.—Relation of the Ureters and Uterine Arteries to the Cervix : *U*, uterus ; *Ur*, ureter ; *AU*, uterine artery ; *C*, cervix uteri ; *V*, section of the bladder at the level of the entrance of the ureters through its walls ; *Va*, vagina.

arteries, enter the pelvis opposite the sacro-iliac synchondrosis. They run on the wall of the pelvis backward, downward, and a little outward behind the peritoneum to a point near the spine of the ischium. They then bend down-

ward, forward, and inward to converge towards the bladder. They lie outside the internal iliac arteries behind the broad ligaments, running down to their base and then under them. They cross the cervix from behind at an acute angle, about one-half inch distant, so as to come in front of and below it. On reaching the wall of the bladder they turn sharply inward and run for half an inch in its wall, finally opening with a small longitudinal slit in the interior of the bladder.

The Rectum is formed by the lower end of the large intestine and extends from the brim of the pelvis to the anal aperture. It is from six to eight inches long, and when empty is one and a half inches wide, but is capable of enormous distension. For convenience of description it is divided into three parts. The upper or *first portion* extends downward, backward, and inward to the third sacral vertebra, and is covered entirely with a fold of peritoneum, forming the *meso-rectum*. The *second portion* turns forward and extends as far as the tip of the coccyx, but is covered with peritoneum in front only, (Douglas' pouch.) The *third portion*, about an inch from its end, turns downward and backward at a right angle to the axis of the vagina to terminate in the anal orifice. It has no peritoneal covering whatever.

Structure. Besides the peritoneal covering already described, it has a muscular coat formed of an outer longitudinal and an inner circular layer of unstriated muscle fibre. At the lower end the longitudinal fibres are intimately interlaced with the *levator ani*, and *internal* and *external sphincter* muscles. The *external sphincter* is a voluntary muscle and surrounds the anal opening. It is attached behind to the tip of the coccyx, and in front it blends with the transversus perinei and the sphincter vaginæ muscles. The internal sphincter is only a thicker part of the circular layer of the rectum and surrounds the anal canal inside the external sphincter. The *mucous*

coat, thrown into numerous folds when the rectum is empty, is covered with columnar epithelium and has many glandular pouches.

Relations. The upper part of the rectum is separated from the uterus by loops of small intestines; lower down it is in close contact with the cervix and vagina, and at the end it forms the posterior wall of the perineal body.

The Pelvic Peritoneum is a continuation of the abdominal peritoneum and covers more or less completely the organs in the pelvis. In front it passes from the anterior abdominal wall to the summit of the bladder, which it covers as well as the posterior wall down to the level of the internal os. From there it is reflected over the anterior surface of the uterus and the fundus. It then covers the whole of the posterior surface and extends down behind the posterior wall of the vagina for about an inch. It next passes over to the rectum, leaving a pouch between the two folds, Douglas' pouch or the *recto-uterine pouch*. From the side of the uterus the peritoneum passes out to the walls of the pelvis, forming the broad ligaments.

The uterus and broad ligaments together divide the pelvic cavity into an antero-inferior and a postero-superior part. In the anterior compartment or *utero-abdominal pouch*, we find the utero-vesical and round ligaments. Its lateral parts, opposite the obturator canal, have been called the *obturator* or *para-vesical* pouches. The posterior compartment is divided into a central deep part, Douglas' pouch, and two shallower lateral parts or *para-uterine* pouches. The bottom of these has been designated particularly as the *retro-ovarian shelves*. The sacro-uterine ligaments, one on each side, form the boundaries between the three compartments. On the side wall of the para-uterine pouch is seen the ureter running under the peritoneum. The ovaries project into these pouches and besides contain loops of small intestines.

Pelvic Connective Tissue. Loose connective tissue is found everywhere underlying the peritoneum, forming one continuous layer. In some places it contains adipose tissue. Just above the symphysis there is a layer, the *pre-peritoneal* fat, continued behind the symphysis as the *retro-pubic* fat. Between the base of the bladder and vagina there is a tight layer of connective tissue and on the front surface of the vagina there is a loose layer. A large mass of connective tissue is found on both sides of the cervix, forming under the broad ligaments the *parametria*. From the parametric region a thin layer extends between the folds of the broad ligament, and from there is continued into the iliac fossa and lumbar region.

The Pelvic Floor. Under this heading there remains to be considered three important structures, the *pelvic fascia*, the *pelvic diaphragm*, and the *perineal region*.

The Pelvic Fascia is a continuation of the iliac fascia. It is attached to the iliac part of the ilio-pectineal line, and to an oblique line on the posterior surface of the pubic bone. It descends on the inner side of the pubes and ischium about half way down, where a strong sinewy cord, the *white line*, or *tendinous arch*, extends from the spine of the ischium to the pubic bone. That part of the fascia covers the obturator internus and is called the *obturator fascia*. At the arch the fascia splits into two layers, an upper, called the *recto-vesical fascia*, which bends inward over the levator ani; and a lower, which follows the obturator internus to the edge of the ischium and pubes, keeping the name of the obturator fascia. At the tendinous arch at the upper insertion of the levator ani, the fascia gives off another layer which runs on the outer surface of that muscle and is called the *anal fascia*. Together with that portion of the obturator fascia lying below the line, the anal fascia forms the lining of the ischio-rectal fossa, and is called the *ischio-rectal fascia*.

The recto-vesical fascia covers the upper surface of the levator ani down to the base of the bladder, the vagina and rectum. In front a layer forms the anterior, and on the side, the lateral true ligaments of the bladder. From the under surface of the recto-vesical fascia a prolongation surrounds the vagina, and forms a strong ring around the vaginal entrance where it joins with the deep perineal fascia. From the spine a band goes to the rectum, which follows the rectum down as a sheath and disappears around the anus. By its distribution the pelvic fascia forms an irregular fibrous layer under the peritoneal cavity, strengthening the pelvic floor and giving support to the organs found in it.

Pelvic Diaphragm. Under the pelvic fascia is a horse-shoe-shaped muscular expansion, open in front, formed by what is generally described as two muscles, the *levator ani* and the *coccygeus*. It is attached above to the posterior surface of the pubic bones, to the tendinous arches of the pelvic fascia, to the front of the spines of the ischia, and lesser sacro-sciatic ligaments. From these attachments the anterior portion goes backward and inward, on either side, some fibres to be attached to the urethra; some cross the vagina and are interwoven on its lateral aspects with its structures; some loops go from side to side between the vagina and rectum, but the greater part joining with the fascial portion goes behind the rectum, grasping the end curve of that tube and supporting it. The posterior fibres are inserted into the side of the sacrum and coccyx.

Function. It strengthens the pelvic floor and forms a strong bed on which rests the uterus and bladder. It is the antagonist of the thoracic diaphragm, being relaxed in inspiration and contracted during expiration, as may easily be seen with a Sims' speculum in the vagina. It lifts the rectum up during defecation and exercises a similar function for the vagina during childbirth.

The **Perineal Region** is somewhat rhomboidal in shape and is bounded by the symphysis and descending rami of the pubes, by the tuberosities and ascending rami of the ischium, and by the lower edge of the gluteus maximus and tip of the coccyx. It may be subdivided by a line drawn across in front of the tuberosities into two parts or triangles, an anterior or *uro-genital*, and a posterior or *anal region*.

Perineal Fascia and Ligaments. The anterior or uro-genital region has beneath the skin and adipose tissue, a layer of dense connective tissue called the *superficial perineal fascia*, analogous to that in the male. Beneath this there is another layer, the *deep perineal fascia* or *triangular ligament*. It has two layers, a superficial attached at the sides to the rami of the pubes ischium, and in front to the pubic bones, behind it is continuous with the superficial perineal fascia and with the deep layer. The deep layer is likewise fastened to the rami of the ischium and pubes. In front it is continuous with the recto-vesical fascia, behind it is continuous with the anal fascia on the lower surface of the levator ani. It is perforated by the urethra and vagina. Where the superficial perineal fascia and the two layers of the deep meet behind, they are fortified by a strong transverse band, the *ischio-perineal* ligament. In the anal region the anus forms an opening in the median line between the nates, and is there surrounded by its sphincter. Between the rectum and the ischium is a pyramidal space, the *ischio rectal fossa*.

Perineal Muscles. Situated beneath the superficial perineal fascia there are three pairs of muscles. The *ischio-cavernosus* or *erector-clitoridis* is attached at one end to the ramus and tuberosity of the ischium, covers the corpus cavernosum, and at the other end is attached to the free part of the clitoris. The *bulbo-cavernosus* or *sphincter vaginae* receives some fibres from the external

sphincter and superficial transversus perinei, passes forward on either side and is attached, one part into the posterior aspect of the bulb, another on the mucous membrane between the clitoris and the urethra, and another on the lower surface of the clitoris.

The superficial transversus perinei is attached to the tuberosities of the ischia and to the median raphe. The deep muscles in the uro-genital region are not well developed. They are the *compressor urethræ*, the deep transversus perinei, and the *constrictor vaginae*, all situated between the two layers of the deep perineal fascia.

The Perineal Body is the name given to the tissues comprised between the genital canal and the rectum, below the point where it turns backward. In shape it is not always the same. Sometimes it is triangular, with the base down, in some it has an upper narrow and a lower broad part, and in others it is nearly quadrangular, or has the shape of a quadrant of a circle.

In structure it is composed of the posterior ends of the bulbo-cavernosus, the fibres of the transversus perinei, the external and internal sphincter ani, and the levator ani muscles, the ischio-perineal ligament, the posterior part of the superficial and deep fascia, the anal fascia, and adipose tissue. It is covered below by the skin,

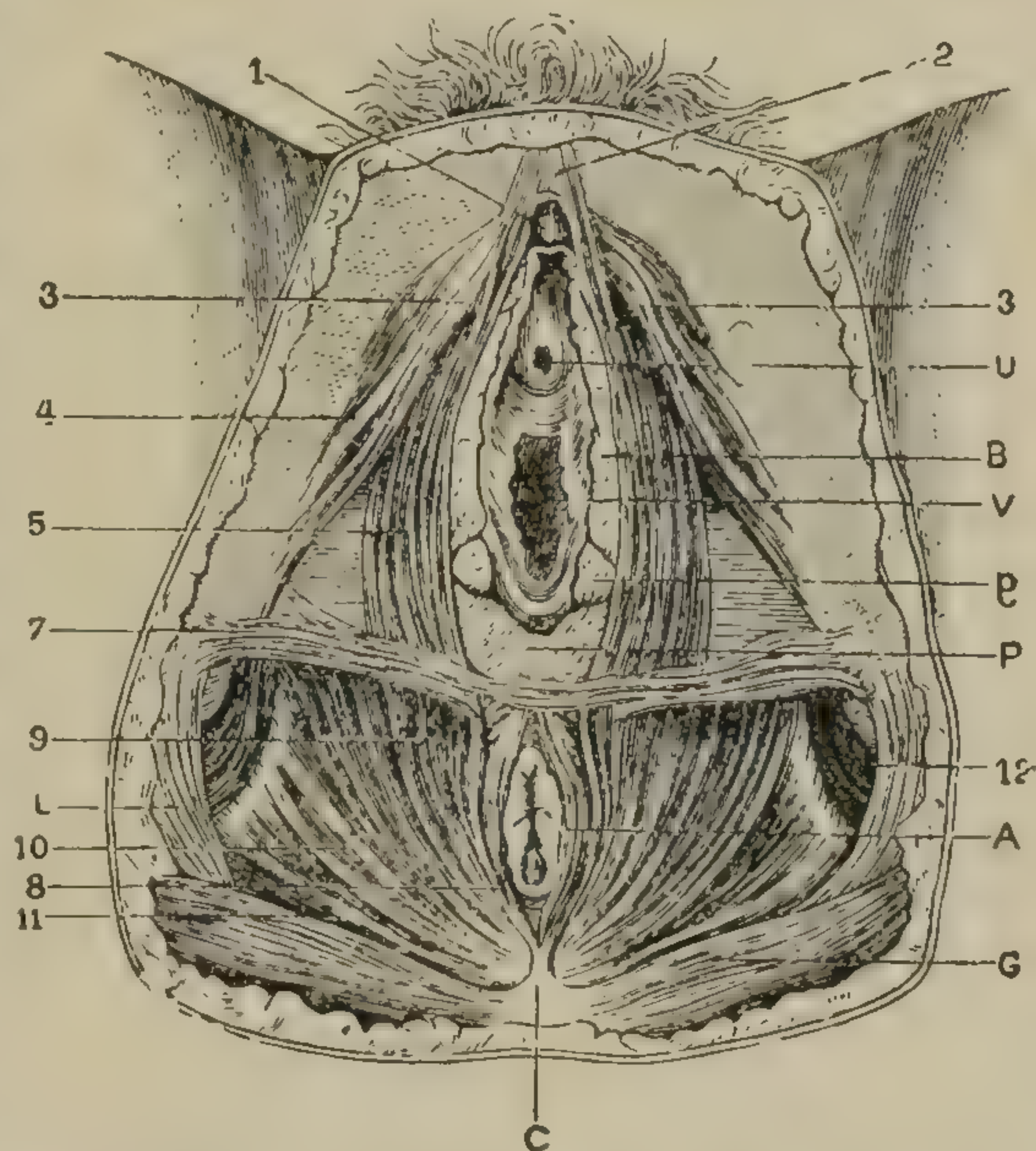


FIG. 16.—Dissection of the Muscles of the Perineum and Pelvic Floor. A. Anus; B. Bulb of the Vagina; C. Coccyx; L. Larger sacro-sciatic ligament; P. Perineal body; U. Urethra; V. Vagina; G. Vulvo-vaginal gland. 1. Clitoris; 2. Its suspensory ligament; 3. Crura clitoridis; 4. Erector clitoridis muscle; 5. Constrictor cunni; 7. Transversus perinei; 8. Sphincter ani ext.; 9, 10. Levator ani; 11. Coccygeus; 12. Obturator ext.

behind by the mucous membrane of the rectum, and above and in front by the mucous membrane of the vulva and sometimes of the vagina. This body is of great importance by forming the centre of the whole perineal region, and by its muscles, fascia, and ligaments being fast-



FIG. 17.—Triangular shape of perineal body.

ened to the surrounding bones, it becomes the chief support of the whole pelvic floor.

The *blood supply* by means of the internal pudic artery is distributed the same as in the male. The *nerve supply* is distributed from the *pudic* branches of the sacral plexus and from the *pudendal* branches of the small sciatic.

The *lymphatics* lead to the inguinal glands.

CHAPTER IV.

GYNÆCOLOGICAL TECHNIQUE.

The number who do not believe it necessary to observe stringent precautions in operative surgery is fortunately very small, and is diminishing every day. The study of bacteriology has placed surgical operations on a thorough basis. Every surgeon must have a true conception of the terms *sepsis*, *asepsis*, and *antisepsis*, and determine at all costs to apply his knowledge practically to his everyday work, and in order that he may have a knowledge of the one, and be able to carry out the other, presupposes a thorough training in the principles of bacteriology at least. The scientific application of an aseptic and antiseptic technique can be thoroughly carried out only by observing every detail, even the most minute, the utility of which has been proved by bacteriological research. It is necessary to keep before one's mind an

exalted idea of surgical cleanliness, remembering that as a chain is no stronger than its weakest link, so aseptic surgery is only so far aseptic as the weakest link in its chain. Success does not apply alone to the successful termination of large or extensive operations, but it applies equally to the lesser details of obstetrical as well as gynæcological work. In these as well as in the former, without that rigid attention to surgical cleanliness, success cannot be expected to follow, but on the contrary, both patient and surgeon may expect to be doomed to disappointment.

The term **sepsis** or **septic infection** includes nearly all the surgical infections, general or local, resulting from bacterial invasion. The symptoms as a rule are due not so much to the bacteria themselves but to their chemical products. When the bacteria have gained entrance into the general circulation and have multiplied there, the system becomes more or less overwhelmed with the bacterial poisons and that condition is called *acute septicæmia*. Localization of the pyogenic bacteria in the organs give rise to multiple abscess formation, and that condition is called *pyæmia*. The phenomena resulting from the absorption into the circulation of the products resulting from the local growth of putrefactive micro-organisms are included under the term *sapraemia*, while the absorption into the circulation of the products resulting from the local action of infective organisms, constitutes an *infective toxæmia*. General septicæmia or pyæmia may be set up by almost any of the micro-organisms which have pyogenic properties, but the most frequently met with in surgical work are the *staphylococcus pyogenes aureus*; the *streptococcus pyogenes*; and the *bacillus coli communis*. Less frequently we have the *staphylococcus epidermidis albus* or the *staphylococcus pyogenes albus*; the *staphylococcus pyogenes citreus*; the *gonococcus* of *Neisser*; the *bacillus pyocyaneus*, or the bacillus of green

pus; and the *micrococcus lanceolatus*, or *diplococcus pneumoniae*.

The principal micro-organisms concerned in supuration are the *micro-cocci* (Gk. *kokkos*, a kernel), a small round body.

The *staphylococcus* (Gk. *staphulos*, a bunch of grapes) *pyogenes aureus*, is more common than any other. It may be shown on the skin, in the secretion of the mouth, beneath the finger nails, in water, in the air, and elsewhere. In culture media it forms large golden yellow masses. It is the most frequent cause of superficial and deep abscesses, and it has often been recognized as the infectious agent in general septicæmia following operations or child-birth. The other varieties of staphylococci, namely, the *staphylococcus epidermidis albus*, and the *staphylococcus pyogenes citreus*, differ little from the foregoing, except as their names imply. The *staphylococcus epidermidis albus* being, for instance, found very abundant on the skin even under normal conditions.

The *streptococcus pyogenes* grows in chains (Gk. *streptos*, a chain) consisting of from four to ten or more cocci. External inflammations due to streptococci are characterized by their spreading character and erysipelatous redness. It is one of the most frequent causes of post-operative peritonitis; the pseudo-membranous anginas of scarlet fever and measles are, as a rule, due to it, and there is a strong connection between it and the different forms of *puerperal infection*.

The Gonococcus. Much pathological importance has been attached to this organism, and it undoubtedly plays an important part in the inflammations of the tubes and ovaries.

The *diplococcus pneumoniae* is the causative factor in acute lobar pneumonia, but it is also known to be a definite pus-producer and has been found in acute abscesses, in empyæma, in suppurative otitis media, in quinsy, and is

not an uncommon cause of puerperal and septic wound infections.

The bacillus coli communis is constantly present in the faeces of man and is more often than any other the cause of acute suppurative peritonitis, especially where there has been an opening between the lumen of the bowel and the peritoneal cavity.

In practising asepsis we aim at bringing about the complete absence of septic material, a condition in its entirety impossible. Most fresh wounds contain a certain number of organisms even under a strict aseptic technique, but either they are non-virulent or present in too small numbers to give rise to the phenomenon of sepsis, finding the surroundings inimical to growth and multiplication, or they are destroyed completely by the natural protective powers of the body tissues.

The maintenance of an aseptic condition is certainly a most important point to be aimed at in formulating a technique, and when formulated it must not apply alone to surgical operations, but to every detail of minor work in which a lesion in the mucous or serous membranes or in the skin may permit of the introduction of such micro-organisms.

In practising *antisepsis* we employ the various means which have been devised for destroying bacteria or inhibiting their action, and the agents employed to bring about this condition are called *antiseptics*.

Sterilization. By this term is meant the process which brings about the absolute and complete destruction of bacteria. The agents chiefly used for the purpose are *heat, dry and moist, and chemical disinfection*.

For carrying out sterilization by means of *dry heat* a hot air sterilizer is required, and to destroy the ordinary non-spore bacteria requires their exposure to dry heat at a temperature of $100^{\circ}\text{C}.$ for an hour and a half, and where spores exist, at a temperature of $140^{\circ}\text{C}.$ for three hours.

Unfortunately the process at that temperature will destroy many substances of vegetable or animal origin, and the method has consequently been supplanted by more speedy and less risky methods.

Sterilization by moist heat. Boiling water is one of the quickest agents which we possess; pyogenic cocci and other vegetative bacteria are destroyed in from one to five seconds, while anthrax spores succumb in two minutes.

Sterilization by steam is another simple and practical method. Several kinds of steam sterilizers have been recommended, one of the cheapest and most convenient being the copper sterilizer of Arnold. One of the most ingenious methods of ensuring complete disinfection is that known as *fractional* or *discontinuous sterilization*. It consists in keeping the fluid to be sterilized in a steam sterilizer at a temperature of 100° C. for twenty minutes on three successive days. By this means any spores which escape destruction at the first heating will have grown out into vegetative forms and will be killed by the second heating. If the process be repeated for a third time, one can be reasonably sure of a completely sterile fluid.

Steam sterilization is however not applicable to all objects to be sterilized, as for instance, the hands of the operator, his assistant, or the part of the patient to be operated upon. For them *chemical disinfection* is required. The ideal chemical disinfection is one that demands a host of qualifications, and when judged by such a standard, no single one fills the requirements.

Carbolic acid is a powerful antiseptic but a dangerous one. Besides being an antiseptic it is also a deodorant and local anæsthetic.

Corrosive sublimate. The extreme toxicity of this chemical is well known and some deaths have been directly traced to its use. It has a strong germicidal power, but not absolutely so, besides experiments have definitely proved that even in weak solutions it injures fresh wounds,

producing when examined under the microscope a distinct line of superficial necrosis.

Potassium permanganate, in solutions varying in strength from 1 to 100 to 1 to 10, possesses some germicidal power. Other chemical disinfectants such as *boric acid*, *naphthol*, and *salicylic acid* are of questionable usefulness. The day has come when the use of antiseptics must be relegated to the period before operation, and reliance placed during operation in the maintenance of an aseptic condition.

THE PRACTICAL APPLICATION OF SURGICAL ASEPSIS.

Under all circumstances personal hygienic measures are essential, both as to the condition of the whole body as well as that of the general clothing. It is best to be provided with an *operating suit* after some approved plan and so constructed as to leave the arms bare. The suit, previously sterilized, can be slipped on after the removal of the outer clothing and before the commencement of the operation. Not only must the operator and his assistants be thorough in the *cleansing* of the *hands*, but all those who in any way aid in the handling of the materials employed during the operation. For this purpose Hunter Robb recommends that the hands and arms be vigorously scrubbed with green soap and water for ten minutes, the water used being as hot as can be borne, and changed ten times. They are then to be immersed for two minutes in a warm solution of permanganate of potassium; next they are to be washed in a warm solution of oxalic acid; next rinsed in sterilized lime water; next in sterilized normal salt solution; and finally immersed in a 1 to 500 solution of bichloride of mercury. Just before beginning the operation, the hands should be rinsed in sterile salt solution to remove any excess of bichloride. The use of the permanganate and oxalic solutions have either never been used or have been abandoned by many good surgeons as affording no additional safety.

One of the newest methods employed for hand disinfection is chlorine, produced by mixing household chlorinated lime with crystallized carbonate of soda. Its chemical action is a little obscure, but it is virtually a production of the so-called chlorinated soda in a fresh and liquid state and is better known by the familiar name of Labarraque's solution. It is used in the following way : After thorough scrubbing with hot water and green soap, as already described, and the nails carefully cleaned, a small tablespoonful of the ordinary commercial chloride of lime or bleaching powder is put in the palm of the hand and on it is placed a crystal of carbonate of soda or common washing soda about one inch wide and half an inch thick (of a size that will permit it to be easily rubbed about like soap). A little water is now added to make a thick cream, and this is rubbed up and down the hands and arms, and well under the finger nails, until the little rough grains of chloride of lime disappear or markedly diminish, or until the creamy fluid thickens into a pasty mass. This procedure should last about five minutes, after which the paste is washed off in sterile water. After the final washing the hands will be found smooth, soft and smelling of chlorine. If the odor persists after the operation it may be removed by washing in a one-fifth per cent. solution of aqua ammonia.

Its efficiency cannot be doubted, for out of forty-two tests made according to the foregoing method, forty gave sterile results.

It is advisable to have a patient who is to undergo some very serious operation, such as an abdominal section, in bed and under observation for a few days prior to operation. Light nourishing food should be given until the last twenty-four hours, when the diet is to be restricted to milk or broths. The bowels should be moved daily, and on the night before the operation a purge should be given, followed the next morning by a rectal enema.

The *field of operation* may be rendered practically sterile by the following procedures, supposing it to be a section:

(1) A bath of soap and water and a vaginal douche daily for three days.

(2) On the evening before operation the abdomen and pubes are shaved.

(3) The parts thoroughly scrubbed with soap and water, then with ether, and then with bichloride of mercury (1 to 1000).

(4) A compress of bichloride (1 to 1000) is afterwards to be applied, and kept there until the patient is brought to the operating table.

After being anæsthetized and placed on the table, the field of operation is again scrubbed with alcohol or ether, next with bichloride (1 to 1000), and finally irrigated with sterile salt solution.

Trivial operations upon the uterus or vagina should be carried out with the same due regard for the dangers of infection. On the evening preceding operation a cathartic is given; the external genitals are cleared of hair and scrubbed after the manner of the preparation of the abdomen, the vagina carefully douched with bichloride solution (1 to 5000), followed by sterile water, and the parts carefully covered over with a large sterile occlusion pad. On the following morning a rectal enema is given, and after being anæsthetized, the vagina is scrubbed with a sponge charged with green soap and water, and after irrigating to remove the excess of soap, it is washed with a warm solution of bichloride, and then with sterile salt solution.

Instruments should be so constructed that they can be readily taken apart and cleaned, and of such material as to permit of easy sterilization. The method of Schimmelbusch is by far the most convenient and effective for general employment, and consists of boiling the instru-

ments for five minutes in a one-per-cent. solution of carbonate of soda. Any ordinary dish will serve for the purpose, but it is convenient to have a specially constructed apparatus of copper fitted with some sort of heating apparatus, if stationary, a Bunsen burner. A flat wire basket fitting into the boiler will facilitate the introduction and removal of the instruments.

Trays made of thick glass are the most satisfactory vessels in which to keep the instruments at the time of operation. By the use of hot water or steam they are apt to be broken, but they may be rendered sterile by first washing them thoroughly with water and then filling them to the brim with, or immersing them in a solution of bichloride (1 to 500), in which they are allowed to remain for an hour. Just before being used they are washed out with sterile water and filled with enough of the same to cover the instruments.

In the choice of sutures and ligatures certain points must be taken into consideration. No suture material will suffice for all purposes, but whatever is used the main points to be considered are, that it must be sterile, smooth and pliable, but not brittle. The substances commonly employed are surgeon's cable twist silk, numbers 1, 2, 3, 4 and 5; silk worm gut, fine and coarse; kangaroo tendon; and catgut, sizes A, B, C, D and E. For the preparation of *silk ligatures* or *sutures*, each size after being cut in appropriate lengths are wound on separate glass reels. On one reel there should be at least four heavy ligatures, three feet long; on the second, ten intermediate or deep ligatures, eighteen inches long; on a third, ten smaller for superficial ligatures, eighteen inches long; and on a fourth, ten small, also eighteen inches long, for fine sutures. The four reels after being put into an ignition tube and the mouth plugged with cotton batten, are sterilized in an Arnold steam sterilizer for one hour the first day and for half an hour on each of

the two succeeding days. The tubes so prepared may be kept in glass jars, but for safety it is best to re-sterilize what may be required immediately before every operation.

Silk-worm gut is a substance admirably adapted for suture material. It is smooth, easily introduced, is non-absorbable, and resists the invasion of bacteria much better than silk or catgut. In preparing it for use, the twisted ends of the strands being cut off, eighteen of them are folded once and placed in a glass tube in which they are to be kept. They are then sterilized after the manner described for the sterilization of silk ligatures.

Catgut is, in many ways, the ideal material for sutures, but unfortunately there is no method of rendering it absolutely sterile. Notwithstanding the most careful preparation, suppuration sometimes follows its use. Many well known surgeons, having sufficient confidence in their methods of sterilization, use it not only for sutures but for small and even large pedicles. The following are a few of the most reliable methods for its preparation:

(1) The raw material is placed in ether for seventy-two hours; next in an aqueous solution of bichloride of mercury (1 to 1000) for twenty-four hours; next in oil of juniper for forty-eight hours; after which it is to be transferred to absolute alcohol.

(2) After being in ether for twenty-four hours, it is transferred to a solution of bichloride (1 to 100) in eighty per cent. alcohol, and changed daily for three days; afterwards it is preserved in absolute alcohol.

(3) After being soaked in ether for twenty-four hours it is wound in three feet lengths on reels, and placed in bottles plugged with cotton batting. The bottles are then placed in a water bath and heat gently applied until the alcohol boils for five minutes. The boiling process is repeated for three days after the method of fractional sterilization.

(4) The catgut is put in ether for a period of from two to seven days, according to the size of the gut, the ether being changed once. It is then transferred to a solution of bichloride in alcohol (1 to 500) for from two to seven days, after which it is preserved in a solution made by dissolving two ounces of iodoform in four ounces each of alcohol and ether.

(5) Five volumes of the formal of commerce with from forty to one hundred volumes of formaldehyde are turned into one hundred volumes of distilled water. The threads to be sterilized are placed in a small flask in a glass and filled with the solution until the mouth of the flask is immersed, the top of the glass being protected with filter paper moistened in a solution of formalin (5 to 100). It is kept at the temperature of the room for twenty-four hours. The formal is replaced by alcohol, which dissolves the little formalin remaining, and after decanting again the flask is filled with alcohol and covered with the formalin filter paper. This method is advantageous as it requires no apparatus, no heat, no difficult manipulation and is applicable to all ligatures, catgut, silk, hair and rubber material.

(6) Modified *Kronig* method. 1. Roll the catgut, twelve strands, in a figure-of-eight form so that it can be slipped into a test tube. 2. Bring the tube up to a temperature of 80° C. and hold it at that point for an hour. 3. Place in cumol which must not be above 100° C., raise it to 165° C. and hold at that point for one hour. 4. Pour off the cumol and either allow the heat of the sand bath to dry the catgut or transfer to a hot-air oven at a temperature of 100° C. for two hours. 5. Transfer the rings with sterile forceps to the test tubes previously sterilized. In drying or boiling the catgut it should not come in contact with the bottom or sides of the vessel, but should be suspended or placed upon cotton loosely packed in the bottom of the beaker glass.

On the part of some surgeons there is an anxiety felt lest the life-time of the catgut may not be sufficient to accomplish the objects for which it was used. If absorbed too soon, there is a fear of recurrent hemorrhage or gaping of an incompletely healed wound. To overcome this difficulty various methods have been adopted for hardening it, the principal agents being chromic acid and bichromate of potash. The catgut is, as usual, soaked in ether for twenty-four hours; it is then placed in a one-per-cent aqueous solution of chromic acid for from twelve to twenty-four hours, according to the density required; next in a fifty-per-cent solution of sulphurous acid for twenty-four hours; next in an alcoholic solution of bichloride (1 to 500) for twelve hours, after which it is preserved in absolute alcohol.

Kangaroo tendon possesses many excellent qualifications. It is smooth, pliable, strong, and not too readily absorbed, from eight to ten weeks being usually required for its disappearance. After being treated according to one of the methods described for the preparation of catgut, it is preserved in a solution of carbolic acid in oil (1 to 20). When required, the necessary number are removed with aseptic forceps, placed momentarily in ether to remove the oil, then wrapped in a sterile towel saturated with hot bichloride solution until they are used, when they will be found clean and soft.

Dressings. When a wound is not to be closed hermetically it is important to apply a dressing which, while being free from pathological bacteria, will prevent the advent of micro-organisms from the outside and at the same time absorb the secretions from the wound and prevent their subsequent decomposition. There is upon the market to-day an abundance of what is known as "antiseptic dressings" and "gauzes" which are often of great utility in the management of wounds when the surrounding circumstances and conditions render their use necessary.

Good *absorbent cotton* in rolls and common *cheese cloth* will suffice for all ordinary surgical dressings. The cheese cloth may be prepared by cutting it in lengths of two yards and boiling for half an hour in a one-per-cent. solution of carbonate of soda, and then rinsed in sterile water and rolled up. *Absorbent cotton, gauzes and bandages*, wrapped in towels, may be sterilized by exposure for three-quarters of an hour to the steam of an Arnold sterilizer, after which, if not rolled or packed too tightly, may be considered absolutely sterile. *Iodoform gauze* is occasionally required for various purposes. The gauze, made ready after the manner already described, is immersed in an iodoform mixture, prepared by mixing enough castile soap with twelve ounces of a one-per-cent. aqueous solution of carbolic acid to make good suds, after which fourteen drachms of iodoform are added and thoroughly mixed. *Permanganate gauze* is not unfrequently used for dressings, having no objectionable odor in itself and has the power of diminishing the odor of foul smelling discharges. It is prepared by saturating sterilized gauze with a one-per-cent. aqueous solution of permanganate of potash.

Sponges. Either the ordinary marine sponges or substitutes made from sterilized gauze are the ones chiefly used. Marine sponges are more elastic and pliable than any other material, but unfortunately they cannot be sterilized by steam without ruining them, and other methods do not always render them absolutely sterile. They may be prepared by first pounding them in a muslin bag to remove all particles of sand and then rinsed in several changes of water. If so desired they may now be bleached by placing them for twenty minutes in a warm solution of permanganate of potash (half a drachm to two pints of water). After being rinsed in warm water they are then immersed in a warm solution of hyposulphite of soda (one and a half ounces to two pints of water), to

which half an ounce of hydrochloric acid *has just been added*, and allowed to remain in it until quite white. After being thoroughly soaked in water they are next placed in a bichloride solution (1 to 500) for twelve hours, and after being again washed in sterile water they are transferred to glass jars containing a three-per-cent. solution of carbolic acid. *Gauze sponges* may be made by wrapping absorbent cotton somewhat loosely in squares of gauze, the corners being brought together at the top and tied with a thread, or they may be allowed to remain flat, the edges being folded under and hemmed.

Drainage. A few years ago nearly ninety per cent. of all cases of abdominal section were drained, now not more than ten per cent. are drained, but as it is yet indispensable it is necessary to decide upon the safest and best means. Where tubes are employed those made of glass are the best as they can be readily sterilized. When drainage is absolutely necessary, as in cases of wide spread injury to the cellular tissue of the pelvis and it is impossible to check the bleeding, or in cases where a cavity has been opened, the walls of which can not be entirely eradicated, or in cases where the pelvis has become infected by the rupture, accidental or otherwise, of a purulent formation, the ordinary glass drainage tube has been supplanted by iodoform gauze. To make it most effectual, the gauze is pushed down to the bottom of the cavity, either inserted in a sausage-shaped bag or in long strips placed in position by the aid of dressing forceps or sponge holders, the free ends being brought to the outside through the abdominal wound or through the vagina, should the pelvic cavity be opened through that route, or drainage by that route desirable.

Irrigating fluids. The routine treatment of irrigation of the pelvic cavity in every case cannot now be considered a necessary practice. Where the structures are non-adherent and there have been no special complications,

there would seem to be no indication for its employment, but after the removal of a mass which contains bloody fluid, or where there has been a great deal of oozing, irrigation may sometimes be useful. If the fluid which has escaped be of a septic nature, irrigation is more likely to spread it further between the coils of the intestines than to remove it.

In selecting a fluid, it is necessary to endeavor to secure one that will give the best results with a minimum amount of harm. The fluid most generally used is plain water rendered sterile by boiling and when required for irrigation may readily be brought to the required temperature, 105° F., by having two vessels, one containing hot and the other cold water. The principal objection to its use is that it has a definite deleterious effect upon the tissues, and to overcome this difficulty, *normal salt solution* is extensively used. It is so prepared as to correspond very closely in specific gravity with the normal serum of the blood. Common salt, in the proportion of forty-five grains to the pint, is dissolved in sterile water, and after being put in sterile flasks and plugged with cotton is sterilized by fractional sterilization. Before operation, two flasks are re-sterilized and one is kept hot while the other is allowed to cool, and when they are required they are mixed to the proper temperature in a graduated jar containing a thermometer.

The use of strong antiseptic solutions, such as bichloride of mercury and carbolic acid, must be unhesitatingly condemned, and in the use of mild ones, such as boric and Thiersch's solutions, it may be said that they possess no advantages over the ordinary sterile water or salt solution.

Some form of dry powder is frequently used to dust over the abdominal wound or after plastic operations, and the ones most in use are boric and iodoform powders. The penetrating odor of iodoform is a strong objection to

it, and it is not to be forgotten that some patients are extremely susceptible to its toxic effects, but on the other hand it is the best germicidal powder in use. A combination of iodoform one part and boric acid seven parts is an excellent mixture, having the advantage of being non-irritating to the skin as pure iodoform sometimes is.

INSTRUMENT LISTS.

It is important to write out lists of the instruments that are used in different operations and to keep them where they can easily be consulted.

INSTRUMENTS FOR AN ABDOMINAL SECTION.

Aspirator.	Nozzles.
Catheters.	Retractors, large.
Cautery (Paquelin).	“ next size smaller.
Forceps, long dressing.	Rubber tubing for pedicle.
“ long hæmostatic.	Rubber tubing.
“ medium hæmostatic.	Scalpels.
“ small hæmostatic.	Scissors, long.
“ bullet.	“ short.
“ rat-tooth.	Sound, uterine.
Drainage tubes.	Speculum, Sim's.
Irrigator.	Sponge-holders.
Needles, large.	Tenaculum, straight.
“ transfixion, right curved.	“ curved.
“ “ left curved.	Trocars, large and small.
“ “ straight.	Two Nélaton's forceps.
Needle-holder.	

INSTRUMENTS FOR VAGINAL HYSTERECTOMY.

Catheter, glass.	Needles, transfixion, straight.
Curettes, dull and sharp.	Needle-holder.
Forceps, dissecting.	Retractors.
“ long hæmostatic.	Scalpels.
“ medium hæmostatic.	Scissors, long and sharp-pointed.
“ small hæmostatic.	Speculum, Simon's, with handles
“ bullet.	and four blades.
Needles, curved, large, medium	Sound, uterine.
and small.	Sponge-holders.
Needles, transfixion, right curved.	Tenaculum, straight.

INSTRUMENTS FOR PERINEORRHAPHY.

Catheter.	Retractor, small.
Forceps, hæmostatic.	Scalpels.
“ long dressing.	Scissors, right-angled.
“ bullet.	“ left-angled.
“ rat-tooth.	“ straight-pointed.
Needles.	Sound, uterine.
Needle-holders.	Tenacula.
Nozzle, glass.	

INSTRUMENTS FOR TRACHELORRHAPHY.

Catheter.	Needle-holders.
Curettes, dull and sharp.	Nozzle, glass.
Dilators, different sizes.	Retractor, small.
Forceps, hæmostatic.	Scalpels.
“ long dressing.	Scissors, straight and curved.
“ rat-tooth dressing.	Sound, uterine.
“ bullet.	Speculum, Sim's, or Simon's with handles and four blades.
Irrigator.	Tenacula.
Needles, assorted sizes.	

INSTRUMENTS FOR DILATATION OF CERVIX AND CURETTING OF UTERUS.

Catheters.	Forceps, rat-tooth.
Catheter, irrigating two-way.	Nozzles, glass.
Curettes, sharp and blunt.	Sound, uterine.
Dilators, three sizes.	Speculum, Sims's, or Simon's with handles and four blades.
Forceps, bullet.	Tenaculum.
“ long dressing.	

LIST FOR ABDOMINAL OPERATIONS OUTSIDE OF HOSPITAL.

Aspirator.	Brandy.
Instruments in bags.	Strychnine tablets ($\frac{1}{60}$ grain).
Basins for instruments.	Rubber tubing.
Cautery (Paquelin).	Sponges.
Coats for doctors and nurses.	Silk ligatures, four sizes (3 tubes).
Solutions : bichloride (1 to 20).	Catgut ligatures, three or four sizes.
“ crude carbolic acid.	Silkworm-gut.
“ normal salt.	Scultetus bandage.
Crystals of permanganate of potas- sium and oxalic acid.	Safety-pins.
Soap and two brushes.	Sterilized gauze.
Rubber sheets and ovariectomy pad.	Strips of gauze for dressing.
Sterilized towels.	Celloidin.
Ether and cone.	Sterilized cotton.
Chloroform and inhaler.	Iodoform gauze.
Hypodermic syringe.	Iodoform and boric acid powder.
	Glass graduate.

LIST FOR PERINEAL AND OTHER MINOR OPERATIONS.

Instruments.	Douche bag.
Leg-holder.	Dressings.
Ligatures.	Bandages.
Sterilized stockings.	Cotton pledgets.
Perineal pad.	

CHAPTER V.

ÆTIOLOGY IN GENERAL.

The causes of the diseases of women are mainly attributable to the errors, direct or indirect, of modern life. They may be thus classified:

1. **Abnormalities produced by hereditary congenital deficiencies of development.** The defective heredity is probably not generally immediate but a gradual declension, for the most part on the maternal side, tending, by continuous degeneration, to induce in the progeny feeble sexual formation. For instance, the first stage may be found in a woman having a uterus of moderate development, but contracted at its opening, and which becomes lacerated in her first confinement. The offspring, possessing a feebly developed uterus, becomes pregnant by chance, it may be long after marriage or after an operation; or she may have a congenitally contracted upper vagina; or a tendency to infantile pelvis, with absence of sexual appetite. She becomes the mother of one child who has yet a feebler unimpregnable uterus, with atrophic ovaries and deficient and most likely painful catamenial discharge.

2. **Abnormalities produced by congenital or subsequent arrest of development owing to the effects of bacterial action.** The eruptive fevers, as measles, scarlet fever, small-pox and probably syphilis also, by the action of their toxines, directly conveyed to the embryo by absorption from the maternal blood, destroy the vitality and power of growth of the germinal genital cells. After birth and at any time previous to full development, these causes and, along with them tuberculosis, may effect and destroy the vitality of the growing cells. The destruction of vital force in the special germ cells produces arrest of development, and as a result congenital deficiencies and arrest of development are found in the ovaries, oviducts,

uterus, vagina, hymen, or vulva. Should the development of the genital ridge be deficient or arrested, the ovaries are so undeveloped that they are unable to arrive at their successive monthly maturity, whence arise amenorrhœa and sterility. If the growth of the upper part of the Mullerian ducts ceases, the oviducts are minute or defective. By the absence of fusion, complete or partial, of the two Mullerian ducts in the genital cord, the uterus is double or bifid. From arrest in one duct and development in the other, the unicorn uterus results, and, after the normal fusion, cessation of vital growth may cause the uterus to be diminutive. In a similar manner there may be two vaginæ, or one defective in size, or no vagina at all.

A uterus, normal in length, but with feeble development and deficient in strength, may have a feeble cervico-corporeal junction and which, as a result, is likely to fall and be converted into the position of ante flexion. Coincident with this there is usually deficiency in the size of the opening. Owing to such a condition, the secretions collect within the cavity, are difficult to expel, and as a result there will arise cervicitis and dysmenorrhœa. In a strong uterus, with a deficiently developed os, there is liability to laceration at parturition, and if the laceration be double, eversion of the lips and granular erosion are likely to follow. If the fresh raw surfaces of a laceration absorb septic germs, pelvic cellulitis results. Should the perineum be deficient in development or rigid, laceration of it is likely to take place, and when septic infection occurs in connection with a lacerated cervix, subinvolution of all the genital structures, as a rule, results. With subinvolution comes the various forms of uterine misplacements. With subinvolution and misplacement, aided by special microbes, as those of gonorrhœa or of the puerperal septic infections, comes endometritis. With its extension to the tubal mucous membrane, comes salpingitis and ultimately by overflow of its contents through the fimbriated ex-

tremity, arises localized peritonitis or abscess formation. Thickening of the tunic of the ovary succeeds local inflammatory action and, as a consequence, there follows painful ovulation and various forms of degenerative changes in the ovaries.

3. **Hereditary constitutional defects in which certain classes of cells morbidly proliferate forming tumors.** The ætiology of the *dermoid tumors* is attributable to the origin and mode of development of the ovary. From the mesothelial division of the mesoderm the ovary is formed. The mesothelial layer of the mesoderm is closely connected with the ectoderm. From the ectoderm are developed the epidermis and epidermal structures, such as hair, nails, glands, the eye, and the mouth cavity with the teeth, all of which structures are occasionally found in the dermoid cyst. Thus, in the formation of the dermoid ovum, some ectodermal cells have by inclusion been incorporated with the mesothelial layers and, continuing to grow, produce a cystic tumor with skin-like walls and containing any or all of the structures formed by the ectodermal layers.

The *parovarian cyst* is caused by an embryonic deficiency of absorption and a subsequent hypertrophic glandular secretory development of the cylindrical lining cells which normally remain quiescent in the sexual part of the female rudimentary Wolffian ducts, situated in the connective tissue of the broad ligaments, and known as the parovarium.

As to the ætiology of *ovarian cystoma*, in the development of the ovary, portions of its germinal epithelium grow inward and some of the cells become ova while deeper multiple cells of the same description form the *membrana granulosa*. The normal function of these cells is to conduce to the nutrition and further development of the ovum. It occasionally happens that the tendency to continuous proliferation of the cells of this layer is greater than required and there is multiplication in excess. At

the same time the inner cells rupture and pour their secretion internally and by such continuous process an ovarian cystoma is formed which persistently enlarges. The degeneration being of a type which effects the development of all the cells of this class, the disease does not attack one follicle alone, but is common to all; hence the cystoma, on its attainment of some size, is almost always multilocular.

Myoma, which is a proliferation of unstriated muscle fibres enclosed in a connective tissue capsule and usually multiple, is attributable to absence of pregnancy, from whatever cause, in a woman of strong sexual development.

Carcinoma or *cancer*, which is a continuous cell proliferation, of epithelial type, invading the lymphatic spaces and vessels and always originating in epithelium derived from the ectoderm or entoderm, has its cause in such sites and conditions as induce excessive formation of cells of degenerating quality. Such sites and conditions are exceedingly common in the chronic granular hyperplastic face of the lacerated cervix.

Continued irritation from any cause, for instance of a myoma, may produce a constant proliferation of a primary or embryonic type in the connective tissue and, as a result, a sarcoma of the round or spindle celled variety is produced.

4. **The training and effects of education.** The long confinement in-doors during school hours, frequently with impure air; the absence of exercise of arms and legs, tending to stagnation of circulation; the stooping posture; the increased attraction of blood to the brain and great call upon the mental powers; improper exercise; the personal competitions culminating in place examination; all have their deleterious effect and tend to develop mental at the expense of physical power, and producing as well, constipation, anæmia, irritable hypersensitive nerves and derangement of the mênstrual function.

5. **Personal habits.** That care, so necessary at each menstrual epoch, is not as scrupulously observed as it should be, and at times injurious consequences, of a temporary or permanent nature, result. Of all the injurious influences to which is attributable the great mass of disease now so prevalent, the greatest is the custom of the alteration of the form of the body and of the position and relations of the internal organs by compression of the lower thorax and abdomen, by means of corsets. The influence is markedly accentuated by the attachment of the skirts and petticoats around the waist and abdomen. In pregnancy the corsets are often worn tight so as to conceal the condition. Society often demands the exposure of the neck, arms and shoulders to the suddenly varying temperatures of heated ball-rooms, corridors, verandahs, and gardens, while closely associated with these are, improper diet, irregular meals and late hours. The influences of absence of marriage, of late marriage, and of ineffective marriage, which includes artificial prevention of pregnancy, are highly deleterious.

6. **Sexual exhaustion** arising from an insatiable sexual appetite, leads to debility, to weakened nervous system, and chronic congestion resulting in endometritis.

7. **Infectious diseases.** The effects of syphilis are seen in hereditary congenital and in simple forms. In the former, malformations are present at birth; in the latter the results, similarly caused, may not manifest themselves for varying periods after birth. The mother may directly transmit measles, scarlet-fever, and small-pox to the foetus. To gonorrhœa is to be ascribed a series of progressive diseases, which are as liable to be as virulent as they are continuous. Septicæmia, induced primarily by the entrance into the system through the blood vessels or lymphatics of micro-organisms, may, if it does not prove at once fatal, produce wide spread damage. Tuberculosis in the genital organs may occur by the arrival of the

tubercle bacillus by the intestines, by the blood, or through the vagina.

8. Lastly may be mentioned those diseases and conditions due to operative causes, among which may be mentioned the introduction of dirty instruments; the application of irritants; forcible dilatations; injections of fluids into the uterus; pessaries; exploratory punctures; and the improper treatment of abortion.

CHAPTER VI.

ANÆSTHETICS.

The entire civilized world owes a countless debt of gratitude to Dr. W. T. G. Morton of Boston, the discoverer of the anæsthetic properties of sulphuric ether; and to Dr. James Y. Simpson of Edinburg, who, a year later, discovered chloroform. Much time has been consumed in discussing the relative merits and demerits of the two agents. The views of surgeons regarding their relative values vary widely, but there can be no doubt each of them has its advantages and disadvantages.

In the administration of such powerful drugs, the fact must not be lost sight of, that they are not free from danger, and in the selection and administration of an anæsthetic, the question of safety should dominate all others. Despite every precaution, and every care taken in their administration, sudden death occasionally will occur. For a long time chloroform was enthusiastically held in favour in this as well as in other countries, but it has gradually been supplanted by ether, on account of its greater safety. From statistics collected with the greatest care, it has been shown that the mortality from chloroform anæsthesia is about one in five thousand, and that from ether, one in twenty thousand. From careful experiments

and observations it has been proved that chloroform exerts a steady, powerful, depressing influence on the heart, by its action on the heart muscle or its contained ganglia, and, consequently, a large number of deaths from chloroform are due to cardiac arrest. When chloroform paralyzes the respiration, it does so by its direct action upon the respiratory centre.

The study of the action of ether on the circulation goes to prove that the primary influence of the drug is to stimulate both the vaso-motor centres and the heart. In etherization there is usually a pronounced rise of arterial pressure which is commonly maintained, even through a prolonged narcosis, and may continue after manifest failure of respiration.

Fatal syncope, by the direct effect of chloroform upon the heart, is the common cause of chloroform death. On the other hand with ether, the direct effect of which is to stimulate the heart, death from syncope is rare.

Notwithstanding the greater safety of ether, there are *circumstances which modify the choice of anæsthetics*. *Old people*, where the chest has become rigid, do not seem to respond sufficiently to the demand made upon them by ether, but bear chloroform well.

In obesity also, ether is often not well borne, producing much excitement and respiratory irritation, chloroform being often necessary to secure tranquility of breathing. In the presence of *organic brain diseases*, including tumors, the dangers of anæsthesia are increased.

Wide spread *atheroma* should give to the surgeon, who desires anæsthesia, much anxiety, and when demanded, chloroform should be given the preference.

In *diseases of the heart*, ether is usually preferable to chloroform; indeed where the heart is very feeble, or the cardiac muscle degenerated, chloroform becomes a very dangerous remedy; and where orthopnœa exists, its use is never justifiable.

A mixture composed of alcohol, one part; chloroform, two parts; and ether, three parts; commonly known as the A.C.E. mixture, if freshly mixed, may be chosen with advantage in cases of atheroma, obesity, and valvular disease of the heart. The local irritant effect of ether on the mucous membrane of the air tubes contraindicates its use in extensive emphysema, in chronic bronchitis attended by expectoration, in dyspnoea, and in advanced pulmonary phthisis. In such cases, if anaesthesia is necessary, chloroform should be employed. In obstructive laryngeal disease or where there is contraction of the trachea, either from within or without, the greatest caution must be exercised, for the irritating effects of ether will increase the tendency to mechanical asphyxia. Both ether and chloroform have a distinct deleterious influence upon the *kidneys*, but, of the two agents, ether is the more dangerous. The great danger arises from suppression of urine and death from uræmia. There are some patients who, although apparently healthy, have sensitive bronchial mucous membranes, show a high rate of respiration in ether anaesthesia, and cough, even in deep anaesthesia. In such cases chloroform should be at once substituted.

Both before and during the administration of ether or chloroform, certain instructions should be rigidly kept in mind.

1. Analyze the urine, especially before the administration of ether; also examine carefully the heart and lungs.

2. Examine the mouth for false teeth or foreign bodies.

3. Loosen the clothing to prevent constriction of the circulation or respiration.

4. Cause the patient to assume the dorsal decubitus, with the head resting low on a small pillow.

5. Anoint the face with vaseline to prevent irritation or excoriation.

6. Instruct the patient to close the eyes and to take deep, full and regular respirations. If excitement or a

dread of danger occurs during the early inspirations, it is well to drop the mask and, in a few kind words, calm and encourage the patient.

7. Chloroform must be administered slowly and mixed always with a sufficient quantity of air. If ether is given, the precaution is unnecessary and may delay anæsthesia, but in case of cyanosis, breaths of pure air should be allowed until the cyanosis has disappeared.

8. Do not commence operation until anæsthesia is complete, indicated by paralysis of the palpebral reflex, and by relaxation of the voluntary muscles.

9. Secure good ventilation.

10. Watch carefully the pupils, dilatation or their failure to respond to light must be viewed as a sign of approaching danger.

11. Watch carefully the pulse and respirations. Quickening of the respirations, as well as weak pulse or respiration, may denote that too much anæsthetic has been given. Loud stertor in chloroform anæsthesia is an alarming symptom, indicating epiglottidean closure of the larynx.

12. Remove from time to time the mucous which is apt to accumulate in the mouth or throat by means of a small sponge on a holder.

13. Watch the color and expression of the face; lividity indicates asphyxia.

14. Allow no solid food for five hours at least before operation, nor should liquid food be allowed later than three hours.

15. Very nervous individuals should receive a hypodermatic injection of a quarter of a grain of morphia twenty minutes before the anæsthetic is commenced.

All plans of administration now in use may be arranged under two headings: *open administration*, which admits of the free access of air, and *closed administration*, in which the patient breathes out of and into a bag, with a more or less imperfect supply of air.

Open etherization may be practiced by simply folding a towel in the form of a cone and putting the ether inside; or by making a cone of thick material which fits tightly to the face, at the apex of which a sponge is placed to receive the ether.

Allis' inhaler consists, essentially, of a series of folds of muslin on a wire frame-work and surrounded by a soft rubber cover. It allows the air to pass freely through, mixed with the ether, and, when properly used, does away with the sense of suffocation and the consequent struggles.

Closed etherization is performed by means of an inhaler such as Clover's or Ormsby's, which are so constructed that the patient breathes in and out of a receptacle containing ether, the amount of air admitted being regulated by a stop-cock for that purpose. When ether is first administered, it should be small in amount and largely diluted with air, after which the air may be gradually withdrawn and the ether pushed more energetically. The patient passes through a stage of bewilderment, the face becoming flushed, the respirations rapid and the pulse accelerated. This is followed by one of excitement, which afterwards passes into a state of muscular relaxation. While administering ether, the fact must always be borne in mind that its vapor commonly kills by asphyxia and not by syncope, hence, though the pulse is to be watched, the respirations should be the principal object of solicitude, and the first appearance of dangerous symptoms should be met by prompt and suitable remedies.

Chloroform may be administered by means of a towel placed over the patient's face, but it is best given on an Esmarch's mask, which consists of a wire skeleton covered with canton flannel. It fits loosely over the nose and mouth, thus admitting air freely, while the chloroform is dropped on it, a few drops at a time without its removal. After inhalation for a few minutes, consciousness is lost, the conjunctivæ becomes insensitive, and the breathing

assumes a somewhat stertorous character. Before complete anæsthesia, convulsive movements, accompanied with cyanosis, often take place. It is best in such cases not to struggle with the patient, but to discontinue inhalation until the cyanosis has disappeared. During the entire period of administration, the finger should be kept over the temporal artery and the respirations watched. A patient may die, either on account of asphyxia or on account of heart failure, the latter being by far the most frequent cause.

Failure of the pupils to respond to light, or their wide dilatation is a sign of approaching danger. This, together with paleness of the face, blueness of the finger nails and a weak, flickering pulse, should cause the anæsthetist to at once apply proper remedies.

Whenever dangerous symptoms threaten, the anæsthetic should be discontinued, either wholly or for a time at least. If the respirations become impaired or the pulse very weak, it may be possible to finish the operation without further administration. When the symptoms of respiratory impediment do not yield promptly, place the fingers behind the angles of the lower jaw and force the jaw forward. If the breathing does not then promptly become normal, seize the tongue with forceps and pull it forward. If ordinary means do not suffice to restore breathing, resort must be had to *artificial respiration*, aided by lowering the head and elevating the body in a position similar to that of Trendelenberg. These efforts may be aided by flipping the chest with a wet towel or by the application of the poles of a Faradic battery, one pole over the phrenic nerve in the neck and the other over the diaphragm. The question of the use of drugs in threatened accidents is a very important one. Hypodermatic injection of ether possesses no advantages, but rather, in cases of ether anæsthesia, increases the difficulty. Alcohol in the shape of brandy or whiskey is an excellent stimu-

lant, but gives best results only when the cardiac failure results from hemorrhage or other surgical cause. The influence of hypodermatics of digitalis, or its alkaloid, is very pronounced, increasing the arterial pressure and the size of the individual pulse beats. Amyl nitrite, for which much has been claimed as a cardiac stimulant, has some effect in increasing the pulse wave, but it must be considered as a doubtful remedy and used with great caution in anæsthetic syncope. The best results are obtained from the hypodermatic injection of strychnia. It causes a gradual rise of the arterial pressure and an immediate and extraordinary increase in the rate and depth of respiration. In order to get the best effect from the alkaloid it is essential to give it in large doses. To a robust individual, with serious anæsthetic heart or respiratory failure, one-eighteenth of a grain may be given at once.

CHAPTER VII.

EXAMINATION IN GENERAL.

GENERAL OUTLINES OF DIFFERENTIAL DIAGNOSIS.

When a patient presents herself for advice and treatment, the first essential to a full understanding of her case, is a complete history. The subject naturally resolves itself into two parts, the *history of the patient* and the *physical examination*.

THE HISTORY OF THE PATIENT.

The first interview between the patient and the doctor is an important one, and it is a very good rule to allow the patient time and opportunity to state her case fully. Not only what is said, but the manner in which it is said, will give the physician an insight into her disposition and character and will enable him to treat her

more intelligently and successfully. The investigation may be conveniently carried out by observing and making note of the following points.

A printed form for case-taking, while not essential, is of great advantage. It saves time and suggests objects for inquiry, which might be overlooked, and, besides, is of great advantage in the subsequent study of the cases.

FORM FOR CASE TAKING.

PRESENT COMPLAINTS AND THEIR DURATION.

1. History :

MENSTRUATION.

Family History

Previous Diseases

{ First appearance

Regularity

Duration

Amount and character

Pain, before, during,
or after

Confined to bed

Last appearance

PAIN.

{ In head

In back

In abdomen

In legs

{ During coitus

In sitting

In standing

In walking

Date.

Pregnancy.

Labor.

Puerperium.

VAGINAL DISCHARGE

LABORS.

{ At full term

Premature

{ Amount

Character

Persistence

Duration

Appetite

Cause of illness (supposed by patient)

Urination

Defecation

Digestion

2. Status Præsens :

General Condition

Condition of the Nervous System

Constitution

Breasts

Abdomen

Vulva

UTERUS.

{ Position

Size

Mobility

Shape

{ Depth of Cavity

Secretion

Perineum	CERVIX.	Position
Vagina		Shape
Broad Ligaments		Length
Tubes .		Density
Ovaries		Secretion
Douglas' Pouch		Internal Os
Bladder		External Os
Urethra		Lacerated
Rectum		
Complications		

3. *Diagnosis:*

4. *Treatment and Progress:*

The age of the patient has a direct bearing on many matters, such as menstruation and child-bearing, and will often throw much light on the nature of the disease. Cancer rarely occurs before the thirtieth or fortieth year, and more often about the time of the menopause.

Social condition and occupation has often a material bearing upon the disease from which the patient suffers. It is of the utmost importance to know whether she spends her time in sedentary pursuits, or, as a shop-girl, kept standing or walking about all day long; or, as a charwoman, whose daily round is one of severe toil and often hardship. Information as to whether the patient is single, married, a widow, or separated from her husband, is often a necessary factor in deciding important questions.

Leading symptoms in the case. An important point is to enquire what brought her to seek advice. In the majority of cases it will be found that actual pain in some part or other is the leading symptom. In other cases pain may be entirely absent, or only present under certain conditions. Others may speak of a swelling in the abdomen as the leading feature. It sometimes happens that the patient complains only of some trivial deviation from health, yet, if her case be gone into systematically and carefully, important information will be forthcoming, which will enable us to suspect the nature of the trouble.

Menstrual history. At the outset, in order to arrive at a correct opinion as to the condition of the menstrual

function, it is necessary to ascertain the normal character of menstruation in the individual, for there are among women wide individual differences consistent with health. The points to which attention should be directed are:—

1. *The age of commencement.* Menstruation usually commences between the ages of thirteen and fourteen years, but it is often seen earlier than that time and occasionally does not appear until later. Climate, race, and accidental causes often bring about a marked difference in the time.

2. *Rhythm of the flow.* It sometimes happens that after the first period or two, the patient sees nothing again for some months, perhaps for a year or more, and after that time, recommences and continues regularly. With most women the flow comes on every twenty-eight days, but in some it appears at shorter intervals, and in some at longer intervals than normal, while in others the menses do not appear with any regularity. On careful enquiry it will be found that the peculiarities are natural to the individuals and that the irregularity must be looked upon as regular for them.

3. *Duration of the flow.* In the majority of women the period lasts four or five days, but here again considerable variation is found, within physiological limits. In some it lasts only a day or two; in others the flow continues seven or eight days, without the presence of any abnormal condition.

4. *The daily amount.* In this also there is considerable room for variation, some soiling but few napkins throughout the whole period, while others have to change very frequently. Enquiry as to how often the napkins have to be changed and the degree of soiling at each change, will give a fair estimate of the amount lost.

5. *The attendant symptoms.* In some patients there is no pain and no discomfort, but as a general thing, as the flow approaches, there is a sense of fulness, congestion,

disturbance and weight in the pelvic organs; often there is pain in a greater or less degree. Sometimes it is accompanied by general disturbance, characterized by frontal, occipital, or general headache, and by nausea and vomiting. The time at which the pain begins varies in different individuals. In some the pain will begin a day or two before the flow, in others a few hours before, while in others it comes on with the flow.

6. *Leucorrhœa*. In a healthy woman there is no discharge, but some women have almost naturally a little discharge of a whitish character for a day or two after the flow ceases. Discharge of a thick glairy mucous in large quantities is however pathological.

7. *Abnormal variations*. The menses, previously normal, may have become too frequent or quite irregular; the duration or daily loss may have increased or diminished; or pain, previously absent, may have become a prominent symptom. In any case we should ascertain, how far the condition deviates from her previous normal condition; what the change has been and the time at which it set in. At the menopause the menses are often irregular; occasionally they stop for a month or two and even longer, then a regular period or two follows, after which they cease altogether. Sometimes they suddenly cease and the patient sees nothing more; in others again, the menopause is ushered in by considerable floodings. It must always be borne in mind, especially in the case of flooding, that women are particularly liable to malignant disease at that time.

Both for future reference and as a guide to the advisability of examination by means of the sound, enquiry should be made, as to the date of the onset of the last period and the time at which the last period closed.

The obstetric history. It is most important to have the obstetric history of the patient, the history of her labors and miscarriages, if any, because a very consider-

able amount of illness which presents itself, is the result of impregnation and of disease following upon delivery or abortion. Ascertain the number of the children, the character of each labor, the date of last delivery, whether there have been any premature labors or miscarriages, and, if so, whether any particular cause can be assigned for the occurrence.

Illness during pregnancy and after delivery. Ascertain whether the health continued good during pregnancy. Unusual symptoms at that period are to be carefully enquired into. Illness after delivery is usually of a febrile character and the cause in nearly every case is attributable to septic mischief.

Previous illnesses. Ascertain from the patient the nature of previous illnesses and whether associated with the pelvic organs or not. Many of the troubles complained of will be found to date from illness occurring at or soon after delivery or miscarriage.

The history of the present illness. Ascertain, first of all, the date at which the present illness began, also the cause assigned for her illness. Of the particular symptoms to which attention should be drawn, pain stands first, because it is one of the most common. The *site* of the pain must be noted, whether it be continuous or spasmodic, and its *character*, whether it be sharp and cutting or dull and aching, and also whether it be associated with *tenderness*. Pain or tenderness is a symptom of a very considerable number of diseases to which women are especially liable, such as pelvic peritonitis, parametritis, disease of the cellular tissue of the pelvis, hæmatocele, hæmatoma, inflammatory diseases of the appendages, metritis, adhesions left from previous inflammations, and finally tumors in the uterus, tubes or ovaries.

Dyspareunia may occur from various causes and is frequently associated with vaginismus. It may be primary, that is, it may have existed from the beginning of

attempts at coitus, or it may have come on afterwards. It may arise from congenital defects, fissures about the vulva, inflamed conditions of the vagina, specific or otherwise, and it may be found in association with urethral caruncle, or even with rectal fissure or piles. The pain is sometimes periodical, that is, associated with the monthly periods, and, when so appearing, becomes one of the most prominent symptoms of dysmenorrhœa. Ascertain where the pain is situated, whether it extends into the hips, down the thighs, or for a considerable distance over the abdomen; also when the pain begins, whether before the flow or with the flow, and if before the flow, the length of time before.

Menorrhagia and metrorrhagia are often symptoms of severe trouble, and any deviation from the normal flow, particularly if extensive, is to be carefully enquired into. It may arise simply as the result of some constitutional disturbance, as anæmia, chlorosis, purpura, but is often a prominent symptom in pelvic hæmatocele and hæmatoma, extra-uterine pregnancy, fungous endometritis, mucous polypi of the cervix, fibroids or myoma of the uterus projecting into the uterine cavity, subinvolution after confinement, and malignant disease of the uterus.

Amenorrhœa. During pregnancy, as well as during lactation, amenorrhœa is the rule, but the menses sometimes persist during the early months of pregnancy and even later. Many women will continue to have their periods regularly during nursing, commencing sometimes a month after delivery, and it is quite possible for a woman to become pregnant during lactation, even if the menses have not appeared. It is necessary to remember these facts, because patients are apt to be misled in consequence, and, even when far advanced in pregnancy, are not aware of their condition.

Local swelling or tumors. We should ascertain from the patient if any swelling, either in the abdomen or in the genitals, has been noticed, where the swelling first

appeared, if persistent or variable in its character, the site where it was first noticed and the direction in which it has grown.

Urinary symptoms. Note the character of the pain, if present, and the time at which it occurs, whether during, previous to, or following micturition. Note also the frequency of micturition and whether it takes place more often at night than during the day. Inquire if there be difficulty in getting the water to pass, or whether the water constantly runs away or is passed involuntarily on coughing or straining. The character of the urine may be partly learned from the patient, but should always be tested by a proper urinalysis.

Intestinal symptoms. Ascertain the frequency with which the bowels are relieved and if defecation be painful, difficult or associated with tenesmus. Note the condition of the tongue and inquire as to the digestion, and whether nausea and vomiting be present; and, finally, ascertain what *previous treatment*, if any, has been adopted, how long it has been carried out, and with what results.

PHYSICAL EXAMINATION.

In the majority of cases correct inferences cannot be deduced from verbal statements alone, and a physical examination becomes essential. The chief exception to this rule is in the case of young girls. It is most often for irregularities of menstruation and for leucorrhœa that young unmarried women seek relief, and as these disorders, in their case, are frequently dependent upon the general health, hygienic measures and drugs will often accomplish all that is necessary. In fact only when such measures have been faithfully tried and proved ineffective, or when there is clear evidence of pelvic disease, is an examination justifiable. Most examinations may be satisfactorily made with the patient, if at her home, lying in her bed or on a lounge, or if the examination is to be

conducted in the office, upon a conveniently arranged couch or chair.

Position. The two chief positions are the *dorsal* and *Sims'*. Of less importance are the *genu-pectoral*, the *erect*, and *Trendelenberg's*.

In the *dorsal position* the patient lies upon the back; the head slightly raised; the knees drawn up and widely separately; and, if necessary, the heels fixed in some kind of holes or stirrups. It is the best position for digital and bimanual examination, and is often employed for ordinary treatment, on account of its convenience.

In *Sims' position* the patient is placed on the left side; the left side of the face rests on a cushion; the left breast touches the table, and the left arm is placed behind the body. Both knees are drawn up, the right being a little nearer the head and in front of the left. This position allows the introduction of one or two fingers high up behind the uterus, permits the use of Sims' speculum, and does not require such a degree of exposure as the dorsal.

In the *Trendelenberg position*, the knees are raised high above the head so that the body slants upward from the shoulders. It is rarely used for diagnostic purposes, its chief advantage lying in the additional facilities it offers the surgeon in operations upon the pelvic organs.

In the *genu-pectoral position* the patient rests upon her knees, the upper part of the chest, the right side of the face and the right forearm. It is sometimes used to replace a retroverted uterus or prolapsed ovary.

The *erect position* is used to discover a prolapsed uterus, a cystocele or rectocele.

Examination under anæsthetics. Nearly all examinations can be made with a full knowledge on the part of the patient, and it should be a rule to examine first in that manner, but it is sometimes impossible, under such circumstances, to obtain satisfactory results. Occasionally

palpation is so painful that the patient cannot endure the slightest manipulation, and, even when no pain is present, it is often found that as soon as the hand touches the abdomen, the muscles, more especially the recti, at once become so tense that it is impossible to feel anything that may be beneath them. Under such circumstances the use of an anæsthetic is not only justifiable, but absolutely necessary, to make a correct diagnosis.

Methods of examination. Three methods, under ordinary circumstances, are made use of: The *visual*, the *manual* or *digital*, and the *instrumental*.

Visual inspection of the external genitals will often reveal many facts, such as atresia of the hymen, swelling of the vulvo-vaginal glands, the presence of papillary growths, venereal ulcers, discharges, urethral caruncle, a lacerated perineum, or prolapse of the vaginal walls.

Digital examination per vaginam. The fingers, especially the index fingers, are instruments of the greatest value in acquiring information, the sense of touch replacing that of vision. The partly closed hand, with the index finger extended, is passed along the inner side of the thigh and, on reaching the vulva, abnormalities of the labia may be detected. The index finger is gently pushed between them into the vagina, examining at the same time for any peculiarity of the hymen, obstructions, prolapsed organs, or gaping from relaxation or laceration. The vaginal walls are palpated to detect abnormalities in them, or of the rectum, or of the urethra or bladder. The finger end next reaches the cervix and is swept around to examine the fornices. By palpation, the size, shape, and consistency of the cervix and the shape of the external os are made out. The fingers pushed up behind will detect a retroverted uterus or displaced ovary, and, when pushed up in front, will feel an anteflexed uterus or the trigone of the bladder.

Digital examination per rectum is best performed in Sims' position. Besides evidence of disease of the rectum obtained by this method, it is a useful method to employ in the case of virgins with sensitive hymen or small vagina. Sometimes the uterus and appendages are better felt from the rectum than from the vagina, and, in case of abdominal tumors, valuable information is to be obtained thereby. Abnormal conditions of the coccyx, such as ankylosis or fracture, can be detected at the same time.

Bimanual examination. In order to secure the required information it is often necessary to make use of both hands. With one index finger impinging on the os, after the method already described, the other hand is placed above the pubes and the finger tips pressed down with increasing firmness until the fundus is felt and the organ made to lie between the examining fingers of the two hands. If the body of the uterus is not found, it should be sought for either in front of or behind the cervix. By this method, the outline, size and shape of the uterus can be made out. By pressing well down beside the uterus, the tubes and ovaries may be palpated, and the method is of the utmost advantage in the diagnosis of pelvic tumors.

Instrumental examination. The *vaginal speculum* is an instrument, by the aid of which we are enabled to look into the vagina and to treat various pathological conditions found. Of these there are a great variety, but the number may be reduced to three types, the cylindrical, the pluri-valve, and the single blade. The cylindrical speculum, as represented by Ferguson's, once so popular, is now seldom used, as the exposure is too limited and the space within it too cramped.

The *bivalve speculum* consists of two blades, joined at one end, and looks and opens something like the bill of a duck. The lower blade is usually a little longer than the upper one. It is introduced closed, either in the dorsal

or Sims' position, and is then expanded by a screw or lever. As the blades are expanded, the cervix settles down on the lower or posterior blade and thus comes into view. There are several varieties, of which Cusco's, Brewer's, and Higbee's form fair samples. It is a very satisfactory instrument, both for inspection and treatment, and can be used without an assistant. The tri-valve (Nelson's or Mott's) has two narrow blades, in place of the anterior blade of the bi-valve.

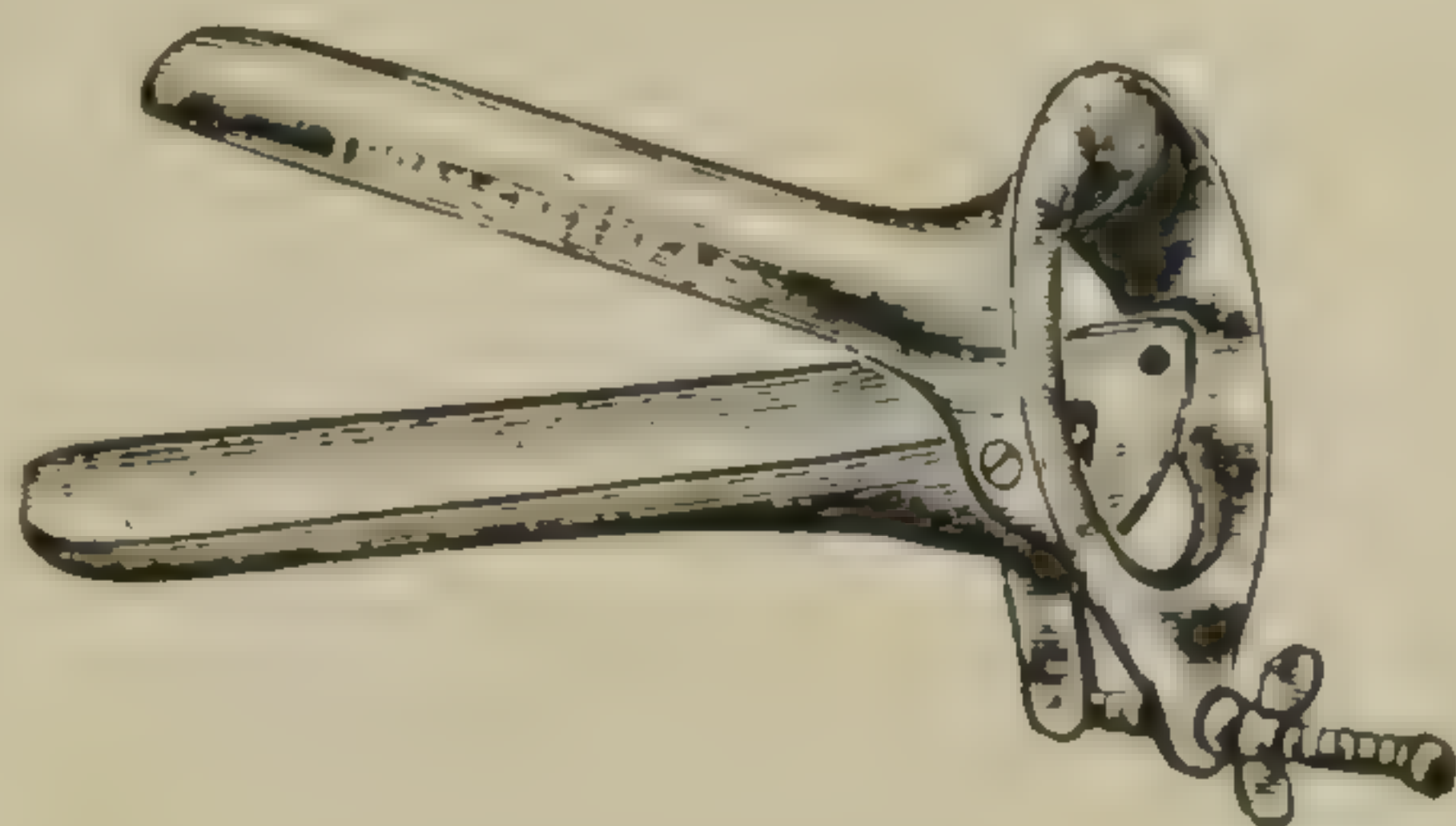


FIG. 18.—Higbee's Bivalve Speculum.

The single blade, or Sims' speculum or retractor, is practically a flattened blade, made somewhat concave on the vaginal surface, and to which a slender handle is attached. For convenience, two blades of different sizes, one at each end, are attached to the handle. When inserted it shows the uterus and the anterior wall of the vagina in their normal position and relations, its object being to pull



FIG. 19.—Sims' Speculum.

back the perineal body and the posterior vaginal wall. Besides this advantage, it readily permits of treatment, and is the speculum chiefly used for operations upon the uterus and vagina. If the cervix does not readily come into view, the failure is owing to its being ob-

scured by the anterior vaginal wall. To overcome this difficulty, a flat blade, shaped like a spatula, or fenestrated, and called a *depressor*, is made use of. To overcome the necessity for having an assistant when using Sims' speculum, many ingenious modifications have been de-

vised to make it self-retaining, but in every case their application is troublesome and often unsatisfactory.

The uterine sound is an instrument made of a more or less flexible metal, usually copper, with a slightly bulbous extremity, and at a distance of two and one-half inches from the extremity, is another bulb, indicating the length of the normal uterus. It should first be bent to correspond with the supposed curve of the canal, as found by bimanual examination. When introduced, it indicates the length and direction of the uterine cavity, and its relation to any mass pressing into or occupying that space. The mobility of the body of the uterus may be determined also, as well as the relation which it bears to a tumor or other mass



FIG 20.—Simpson's Sound.

adjacent to it. It is a very useful and, when properly used, harmless instrument, but in handling it, it must never be forgotten that it is capable of perforating the uterine wall, and that it is being introduced into a cavity from which absorption easily takes place. In its introduction much difficulty is often experienced by the point catching in the folds of mucous membrane in the cervix, or by the opposition made by flexion. The difficulty may be overcome by embedding the curved point of a tenaculum in the tissues of the anterior lip and making counter-traction, the effect of which will be to straighten out the canal.

The probe is a much thinner and very flexible rod used exclusively for exploring the inside of the uterine cavity.

Uterine dressing forceps, of which a great variety have been devised, are invaluable for wiping out the

cervical mucous while making inspection, for disinfecting the vaginal fornices, and for carrying medicated material to the intended point of application.

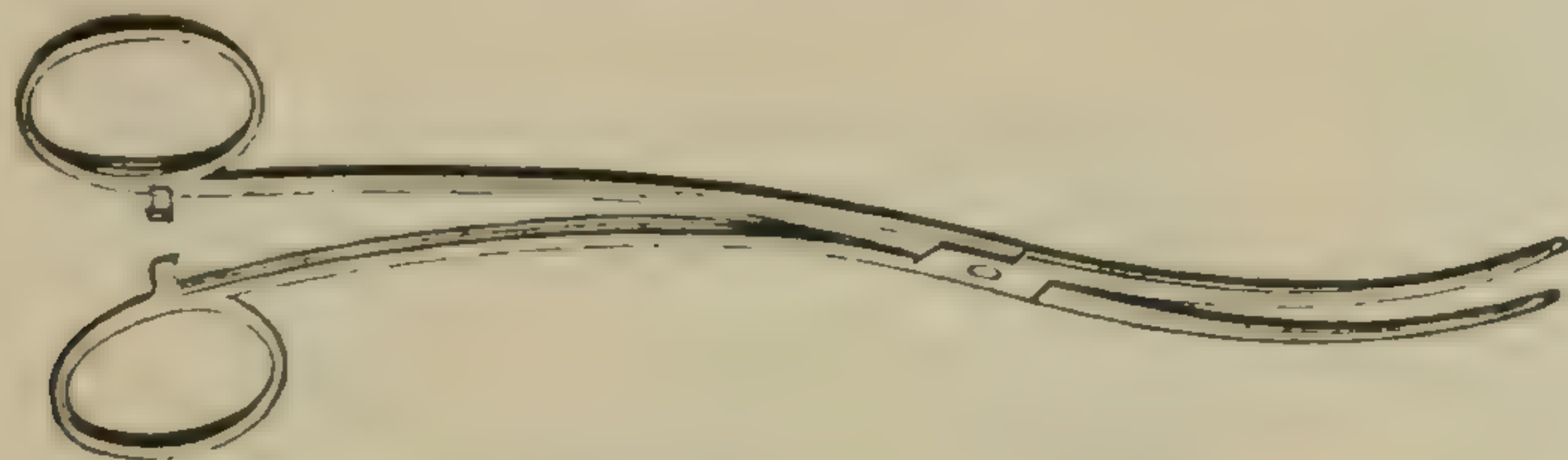


FIG. 21.—Bozeman's Dressing Forceps.

The *vulsellum* is a pair of forceps, each blade of which ends in a double hook. It is used for seizing and pulling

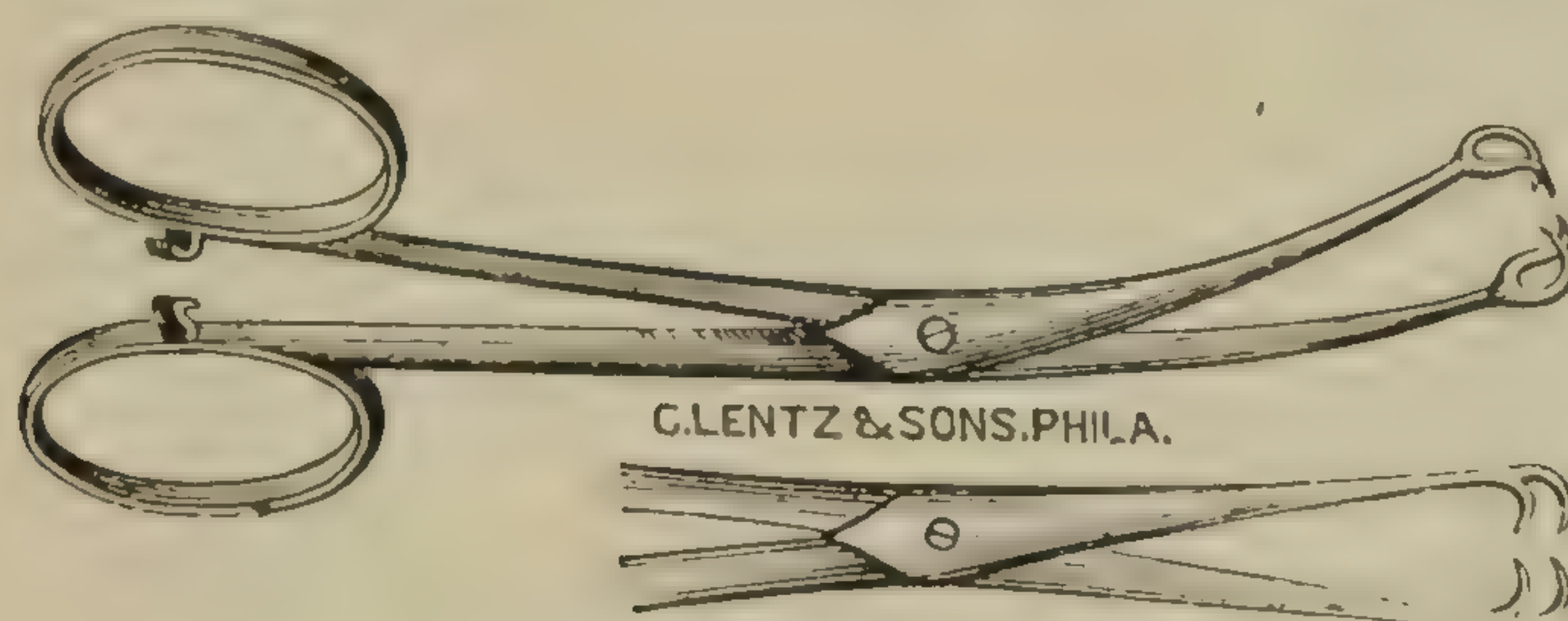


FIG 22.—Vulsellum Forceps.

tissue, and is thus useful in steadying the uterus, while introducing the sound or dilating the cervical canal.

Examination of the interior of the uterus. When bimanual and speculum examinations make it evident that the disease is seated within the uterus, an exploration of its interior is essential. Usually the cervical canal presents an effectual barrier to exploration, either by finger or instrument, and some method of dilatation must therefore be used. This may be done *slowly* by means of tents, or *rapidly* by graduated dilators or dilatating forceps.

Gradual dilatation, by means of tents, has now fallen into complete disuse, except in isolated cases. From the fact that it is impossible to render them aseptic and from the necessity for the use of two or three to obtain sufficient dilatation, their use exposes the patient to great danger. For diagnostic purposes and as part of treatment, dilatation

is best accomplished rapidly by instruments. For the lower degrees of dilatation, Hanks' hard rubber or steel



FIG. 24.—Goodell's Dilator.



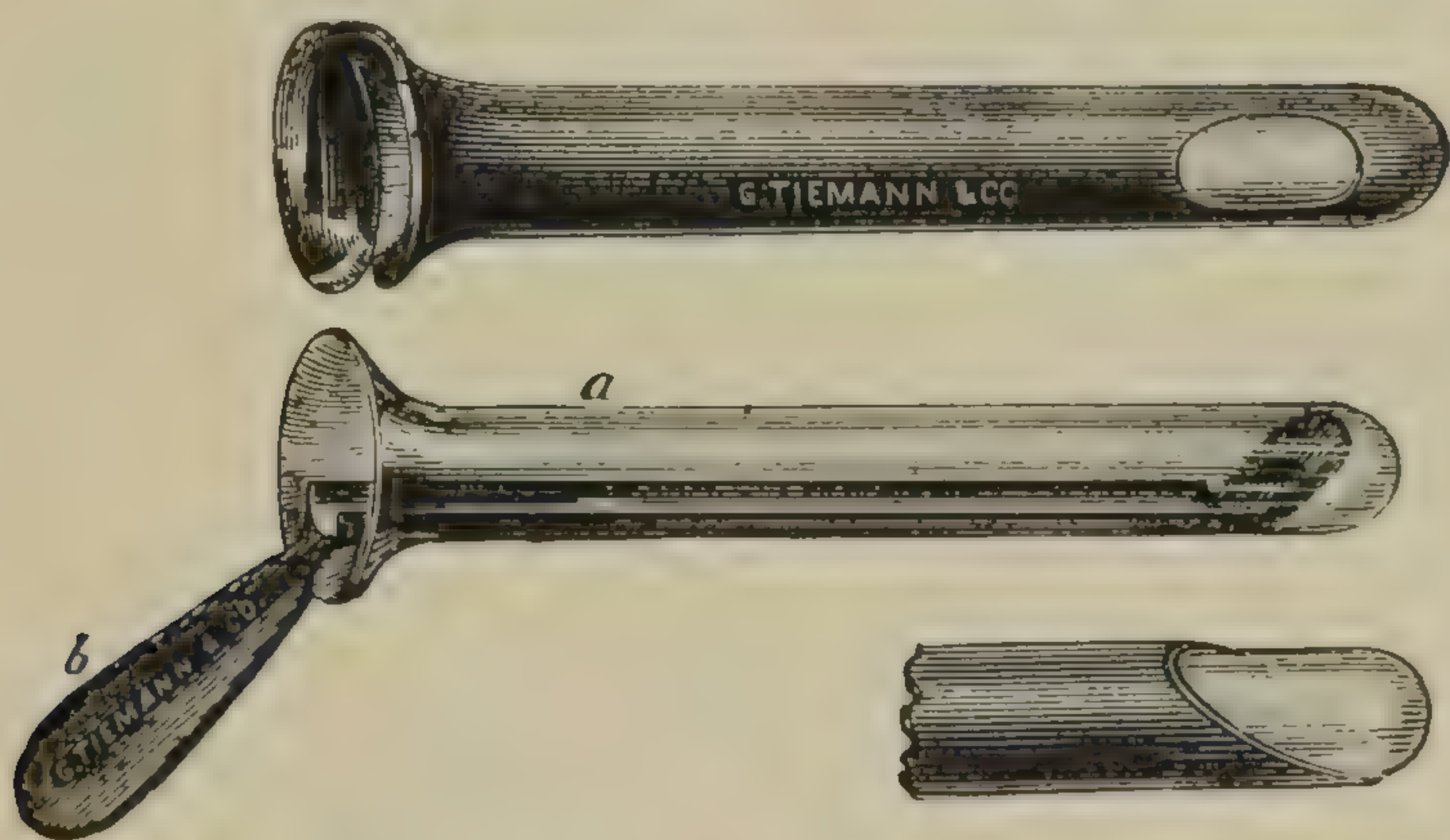
FIG. 23.—Hanks' dilators.

dilators, which come in a set of six, embracing twelve numbers, are very serviceable. Commencing with the largest that will enter the canal, they are passed in, one after another, until the required degree of dilatation has been required. For a higher degree of dilatation, some of the steel branched dilators may be used. A very satisfactory instrument, perhaps the best, is Goodell's modification of Ellinger's, but being rather thick in the blades, it may be found impossible to insert them when the cervical canal is small. Under such circumstances it is best to commence with

a pair of lighter blades, such as that known as Wylie's. After insertion, the handles are to be gradually compressed and, as the parts yield to firm, slow pressure, what is gained may be held by the screw or ratchet. The use of this instrument, as well as of the graduated dilators, will be facilitated if the cervix be steadied with a vulsellum.

The curette is an instrument used for scraping off or removing pathological or other structures from the inside of the uterus. Although mostly used as a therapeutic agent, sometimes it is used to secure a specimen for gross or microscopical examination. There are two varieties in use, one sharp and stiff, the other dull and somewhat flexible.

From the frequent association of urinary symptoms with uterine diseases, the best methods for examining the urethra and bladder should be known to all practitioners. Some knowledge of the condition of the lower part of the urethra may be gained by inspection, some bladder and urethral affections may be recognised by examination with the finger, but for the determination of the exact condition of the lining membrane of the urethra, an endoscope is



FIGS. 25, 26, 27.—Skene's Endoscope.

necessary. By inserting to its full length a simple tube, similar to an ear speculum, the field being illuminated with a head mirror, the whole urethra may be fairly well inspected as the tube is being withdrawn. The most satisfactory urethral endoscope is that known as Skene's. By means of it, not only the neck of the bladder and urethra may be inspected, but applications by means of cotton or a spray may be made to any part of the canal. The bladder can be explored digitally by first gradually

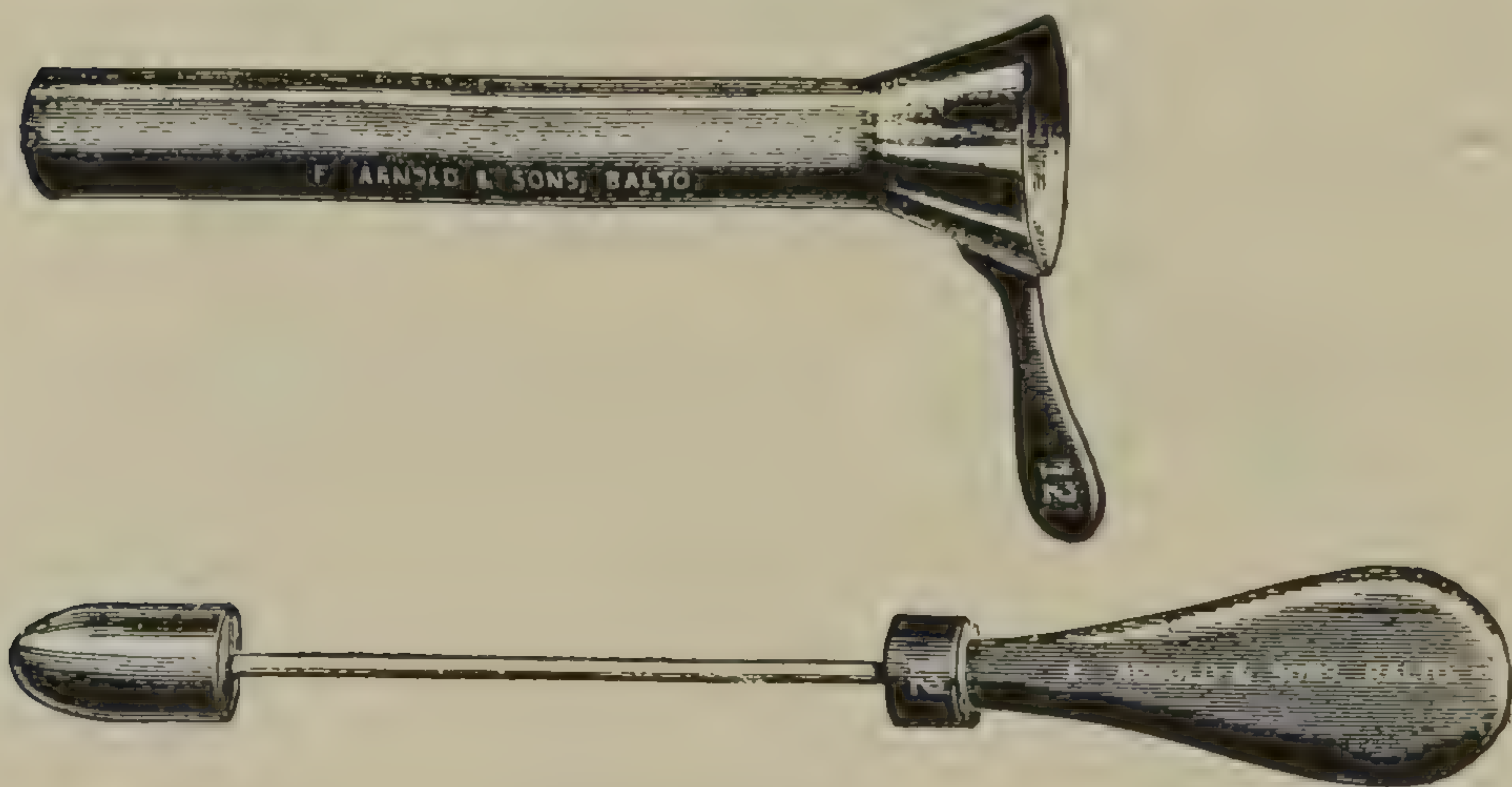
dilating the urethra with Simon's instruments until the largest has been passed, after which the finger can usually be inserted into the bladder.

Dr. Howard A. Kelly has extended and simplified the technique of the examination of the bladder and ureters, which permits of direct visual inspection of the female



FIG. 28.—Double Urethral Dilator.

bladder and ureteral orifices, and which renders it possible to complete the catheterization of both ureters within a few minutes after the introduction of the speculum. The following instruments are required: A urethral dilator; a series of specula with obturators; a head mirror with some form of artificial light; a pair of delicate mouse-toothed forceps; an evacuator for withdrawing residual urine; a



FIGS. 29, 30.—Speculum and Obturator ($\frac{2}{3}$ natural size).

ureteral searcher, and a ureteral catheter. The hips are somewhat elevated, and, after the necessary degree of dilatation, a proper sized speculum is introduced and the obturator withdrawn. By means of reflected light from the head mirror, it is possible to examine fully the interior

of the bladder. Residual urine obstructing the view may be removed with the evacuator, or, if very small in amount, by little balls of absorbent cotton held in the mouse-toothed forceps. After a little practice the sites of the urethral orifices can be located. Dr. Kelly suggests the following valuable aid for locating them: "A point is marked on the cystoscope at a distance of five and one-half centimetres from the vesical end, and from the point



FIG. 31.—Cystoscopic examination of bladder and direct catheterization of ureters.

two diverging lines are drawn toward the handle, with an angle of sixty degrees between them. The speculum is introduced up to the point of the V and turned to the right or left, until one side of the V is in a line with the axis of the body. By elevating the endoscope until it touches the floor of the bladder, the ureteral orifices will nearly always be within the area covered by the orifice of the speculum."

The searcher is next employed, and if what is seen is really the orifice, it will at once pass readily into it. The ureteral catheter may then be substituted for the searcher and the urine collected, as it passes from the kidney.

Examination of the abdomen. In a certain number of cases inspection of the abdomen is important. The practiced eye can distinguish the pointed prominence caused by a tumor or pregnancy, and the flat enlargement, owing to the presence of ascites or super-abundant adipose tissue; and when present, pigmentation, striae albicantes, and a protruded navel are readily observed. By palpation, the practised touch will show the size, consistency, and relations of a tumor, its mobility, and its smoothness or irregularities.

Percussion permits of defining, with greater accuracy, the height to which a tumor rises, and the extent and mobility of the area of dullness.

Auscultation is of value only in the differential diagnosis of pregnancy from other varieties of abdominal tumor.

CHAPTER VIII.

GYNÆCOLOGICAL THERAPEUTICS.

To be successful in the treatment of diseases of women, pelvic disorders are not to be looked upon as isolated conditions, but must be viewed, in a large number of cases, as arising out of an existing or pre-existing constitutional state, or faulty regime of the patient. Thus the circulation and the digestive and other important systems may influence or be influenced by the pelvic organs, and when deciding upon a line of treatment, the general condition of the patient must never be lost sight of.

General hygiene is an important factor. The mind should be as far as possible free from anxiety and strain, yet at the same time actively employed in some healthy, intellectual pursuit, and the body stimulated by exercise suited to taste and circumstances. The strictest attention should be paid to the menstrual period, and every girl should be taught how to take care of herself during the performance of that important function. Regularity in the action of the bowels and attention to their daily evacuation, regular attention to the calls for micturition, attention to the functions of the skin, and regularity of meals and sleep, both as regards time and duration, are also of great importance. The clothing, while not being too heavy, should be of such texture and material, and so distributed, as to keep every part of the body equally warm. Exercise in some form or other is often beneficial, but should never be excessive. What the particular form of exercise shall be, must depend upon the taste or occupation of the individual. Each condition with which we have to deal will suggest points applicable to it.

In the pelvis, as elsewhere, pain and disordered functions are indications for rest, and in no department of medicine is rest more essential than in this. In the majority of patients, their sufferings are due to fulness of the vessels within the pelvis, and to overcome this rest in the recumbent position is absolutely necessary. But rest to be complete must be not only local and general, but physiological as well.

A very large number of gynæcological patients suffer from anæmia, and often from anorexia. Careful attention must be given to the diet, and when so prescribing, precise orders should be given in regard to the time, the quality and quantity of meals, as well as to a proper variety.

Drugs. *Purgatives.* In no class of diseases are purgatives more useful. Constipation, acting locally, may

seriously displace the pelvic viscera, or by pressure promote congestion and discomfort. In many cases of chronic pelvic disease, a course of purgatives, such as sulphate of magnesia, cascara sagrada, aloes, with an occasional dose of calomel, will greatly relieve the patient, and where there is systemic portal congestion, morning draughts of Carlsbad salts, or Hunyadi Janos, Apenta, or Franz Josef mineral waters will, by their mild laxative action, afford much relief. In acute pelvic inflammation, saline purgatives are highly beneficial. Enemata of warm water, and rectal injections of glycerine, are useful adjuncts or alternatives.

Tonics. Nearly all kinds may find a place in the treatment of pelvic disease. Unless contra-indicated, *iron*, in some form, is one of the most active, and when administered gives the best results when combined with a purgative. *Arsenic* is valuable when leucorrhœa is present in anæmic girls with a chronic catarrh of the vagina or cervix. Combined with iron, it acts well in anæmia and chlorosis with scanty catamenia. *Quinine*, aside from its specific effect, has a special tonic action on the uterine muscles, and is therefore useful as an adjunct.

Sedatives, especially the stronger ones, should be administered with great caution, for often the condition for which they are prescribed is a recurrent one, and the repeated administration may lead to the abuse of these agents.

Special Gynæcological Drugs. *Ergot* is used for two main purposes, to encourage uterine contraction and to lessen uterine hemorrhage. On this account, it is administered for passive uterine hemorrhage, in uterine fibroids, fungous endometritis, subinvolution, and in uterine congestion. In chronic hemorrhage, or when it is given for lengthened periods, it should be combined with acids and purgatives.

Gossypium, in the form of fluid extract, or decoction freshly prepared, is an emmenagogue and parturient. It has a tonic influence on the uterus, relieves pain, and often seems to act better than ergot in arresting passive hemorrhage.

Hydrastis Canadensis, in the form of fluid extract or tincture, has a decided ecbotic action and, if taken regularly, will check chronic hemorrhage, and besides has a decidedly sedative effect.

Hamamelis has been accorded a high place in the scale of uterine hæmostatics where passive engorgement exists.

Cannabis Indica, in the form of extract, is extremely useful in cases of menorrhagia with pain, in dysmenorrhœa, and in some cases of fibroids. It is apt to affect some women peculiarly, and at first must be given cautiously and in small doses.

Viburnum prunifolium is an anti-spasmodic, relieving painful contraction of both voluntary and involuntary muscles and is, therefore, useful to prevent abortion in cases where uterine contraction precedes the death of the fœtus. A large group of anti-spasmodics and sedatives may be used for the relief of pelvic pain, among which may be mentioned some of the coal tar derivatives, such as *phenacetine*.

The *Bromides* allay the pain and restlessness due to increased local tension, as in congestion of the ovary. They tend to lessen hemorrhage of a passive type, and are excellent remedies to anticipate the headache and nausea which precede dysmenorrhœa.

Chloride of Ammonium acts upon the portal system and thus tends to relieve pelvic congestion. It is useful in simple congestion, subinvolution and chronic metritis.

Chloride of Calcium, given thrice daily, in doses of ten to twenty grains, often acts like a charm in some cases of menorrhagia.

Resolvents are often called for in chronic inflammation, to promote absorption of long standing inflammatory exudation. The most important of these are, iodine in the form of iodide of potassium, sodium or ammonium; mercury in the form of bichloride, and gold in the form of chloride of sodium and gold.

The local therapeutic effects to be derived from the application of *heat* and *cold* are well known.

1. *External application.* *Cold*, locally applied, is a depressant, checking the vital action and diminishing the blood supply, and hence is useful in hyperæmia or congestion of the pelvic organs. It may be applied in the form of ice-bags, or by means of a Leiter coil. *Heat*, in the form of hot baths, is mainly sedative, relaxing the skin and its glands, dilating the peripheral vessels, and thus relieving congestions of internal viscera. It is therefore useful in congestive dysmenorrhœa, and, by its power of relieving muscular spasm, is serviceable in spasmodic dysmenorrhœa and in cases of uterine, tubal and other pelvic and abdominal colics. *Hot foot and sitz baths* act somewhat similarly and are particularly useful in relieving pelvic congestion produced by sudden arrest of the catamenia. *Mustard*, added to such baths, increases their effects. *Poultices* and *fomentations*, both as to their utility and action, may be considered as local baths. If a sedative effect is required, opium, in the form of laudanum, may be added; if a stimulating effect is required, turpentine. Heat may also be applied, locally, by means of *hot water cans* and *rubber bags*.

2. *Internal application.* *Hot water* has a far more extensive field of usefulness in the pathology of women's diseases than any one agent. Hot water may be made to enter the vagina while in a bath, by means of a speculum, but the usual method employed is by means of a *douche apparatus*. In all cases, the flow into the vagina should be continuous, hence, for the purpose, an elevated douche-

can, or some syphon arrangement, is better than the ordinary hand-bulb syringe. The vaginal nozzle should be of some smooth material, easily made aseptic, and, during administration, the patient should lie flat on the back with the pelvis raised on a *bed-bath*. For merely cleansing the vagina, tepid water will suffice, but its effect may be increased by adding a dram of bicarbonate of soda, borax, or boracic acid, to the pint. For the relief of congestion, water, at a temperature of 100° to 105° F. is indicated, but for the arrest of hemorrhage, a higher temperature is required. By the addition of medicinal agents the douche can be rendered antiseptic, anodyne, astringent, or sedative. Cold water applied to the vagina is unsafe and should not be made use of.

Counter irritation to the skin may be applied in a variety of ways by such drugs as mustard, turpentine, iodine, croton oil, or cantharides.

Applications to the vagina may be made in various ways. *Douches* are a convenient way of applying medicaments. If for antiseptic purposes, bichloride of mercury, 1 to 4000 to 1 to 2000, and carbolic acid 1 to 200, may be used, but their prolonged or frequent use is to be avoided, owing to the dangers from absorption. Weak solutions of potassium permanganate and of sulphocarbolate of zinc may also be used, but are not so effectual. If required for astringent purposes, plumbi acetate, zinc sulphate, alum, and tannin are the best.

Medicated pessaries may be used for their local effect, as well as for their remote, and when for the latter, double the usual dose should be administered.

Pessaries of glycerine, combined with gelatine, will relieve vaginal congestion and encourage secretion. If so desired, drugs may be added to such pessaries, and it is in this form that ichthyol has its most useful sedative and absorbent application, particularly in subinvolution associated with endocervicitis and granular erosion. The

drugs most often used as sedatives are cocaine, morphia, extract of belladonna and extract of henbane; as astringents, alum and tannin, and, when so employed, may be combined with cacao-butter or gelatine. For this purpose, gauze, too, saturated with various ingredients, is readily applied.

Tampons made from wool or absorbent cotton, rolled and tied in sizes most convenient for the work required of them, may be used to advantage as conveyers of medicinal agents, such as boric acid, ichthyol in glycerine, lysol, aristol, balsam of Peru, aqueous solutions of alum, and other agents; and, when so medicated, serve a good purpose for stimulating, sedative, or astringent applications. They are also used as temporary means of support, for exerting pressure, and to soften and stretch organized bands within the pelvis. Tampons may be also employed to plug or to tightly pack the vagina for the arrest of hemorrhage and to maintain an aseptic condition.

Direct application of drugs may be made, through a speculum, to any affected area of the vagina by means of a pledget of absorbent cotton held in the jaws of a pair of uterine dressing forceps. Nitrate of silver, in various strengths, solutions of sulphate of copper, tincture of iodine, carbolic acid, iodized phenol, liquor ferri perchloride, ichthoyl, glycerite of tannin and such like, are all useful therapeutics agents in appropriate cases.

Applications to the uterus. The same drugs used for the vagina may also be used for the vaginal portion of the uterus, and are to be applied in the same way. To apply substances to the cervical canal, it must be exposed, and by the aid of a Burrage's speculum and cotton holder, the medicament is directly applied. Until very recently, it was the practice to make applications of many of the remedies mentioned to the cavity of the uterus, but it has now fallen into disuse, and in cases, where previously employed, the practice of to-day is thorough curettage and

cleansing and draining of the canal. When that has been thoroughly done, it is all that is necessary.

Intra-uterine injections are much more dangerous than vaginal. Large uterine injections of warm water, medicated or otherwise, may be used for cleansing and disinfecting the uterus, and for checking hemorrhage. If the cervix has been thoroughly dilated, a curved glass

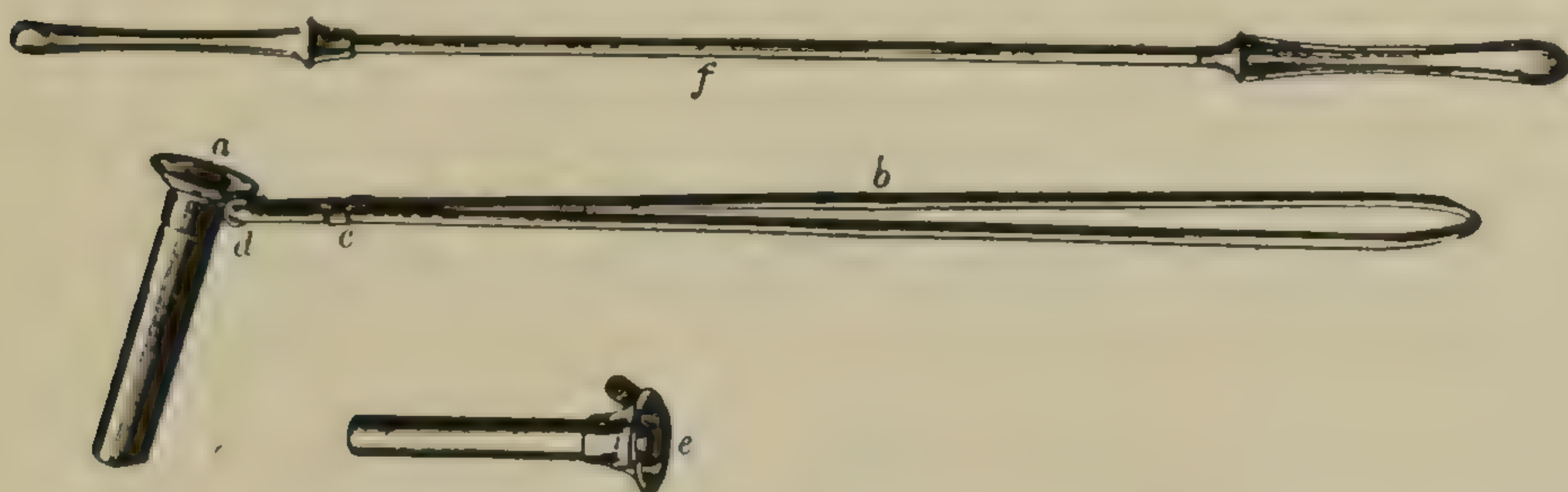


FIG. 32.—Burrage's Cervical Speculum. *a*, tube; *b*, handle; *c*, movable clasp; *d*, small tube at right angles to main tube; *e*, smaller cervical tube to replace *a*; *f*, obturator fitting the two tubes.

single current tube is preferable, but if the cervical canal is not so wide, a metal double-current uterine tube should be used, such as Boseman's, a Cusco's or other speculum having been previously introduced, and while administering the flow should be carefully watched.

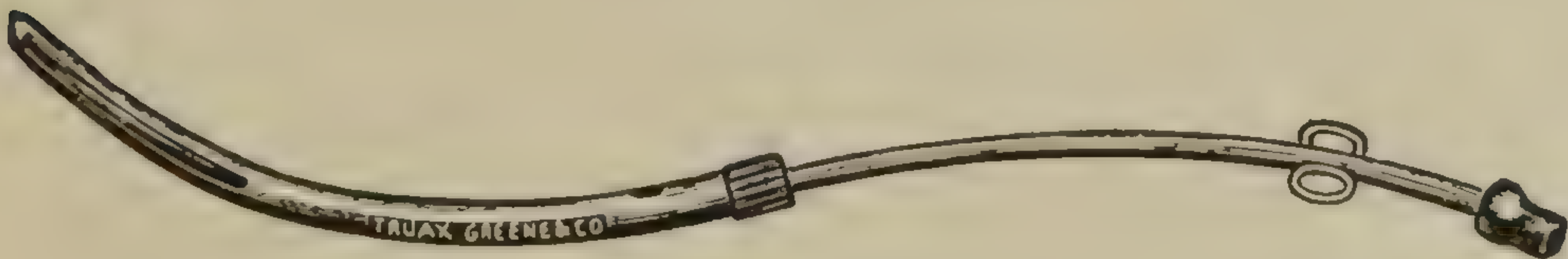


FIG. 33.—Intra-uterine Douche.

Vesical injections are much used in the treatment of diseases of the bladder. For large injections, a fountain syringe with a hard or soft catheter attached and a two-way stop-cock which allows the bladder to be alternately filled and emptied, acts very well. When simple irrigation is required, Nott's double current catheter proves very serviceable. A simple, yet very effectual vesical douche may be made by attaching to one end of a rubber tube a

small funnel, or the barrel of a large glass male syringe, and to the other an ordinary glass catheter. The fluid is poured into the receptacle, held at the required distance above the patient, and, when sufficient has entered, the

receptacle is lowered, which permits the fluid to be syphoned out.

Curetting. In the treatment of diseases of the uterus this minor operation is often demanded. It requires the administration of an anæsthetic, although some can undergo the ordeal without it. The cervical canal is first dilated carefully with steel dilators to such a size as will readily admit the curette. The cavity of the uterus is next flushed through a Burrage's speculum, or by means of an intra-uterine douche, with a 1 to 2000 solution of bichloride. The cervix being grasped with a vulsellum or tenaculum, to steady the uterus, the sharp curette is introduced and the entire cavity carefully scraped, the persistence



FIG. 34.—
Tenacula.

and vigor with which this is done being governed by the conditions present. The anterior and posterior walls, the lateral sulci where

these two come together, the fundus, and the recesses of the cornua are scraped in turn. The cavity is next irrigated with the warm bichloride solution, and dried with a little cotton on a holder. Should circumstances demand it, the cavity may be touched over with carbolic acid, tincture of iodine, or iodized phenol, after which it



FIG. 35.—Wire-
loop Curettes.



FIG. 36.—Sharp
Curette.

is again to be dried with cotton. If deemed advisable, the uterus may be drained by the introduction of a strip of iodoform gauze, or it may be packed with the same material. As a rule, good drainage is all that is necessary after thorough curettage.

Pelvic massage. Though massage, in its different forms, enters into the treatment of various female affections, it is also valuable as a part of the general care of the body, both to increase the activity of the blood current so as to bring it more frequently in contact with the oxygen of the lungs, and to promote nutrition, by making the muscles work out what elements they have already taken up, but have not utilized. By this means, the body at large becomes more vigorous and robust, and thus will respond more effectually to therapeutics and to the local treatment of the organs, the care of which are being considered. A form of massage, known as pelvic massage, has been elaborated and brought to bear upon the class of ailments which usually prove most intractable, and for the treatment of which the means at our command have always been too few. This class of treatment has given excellent results, when judiciously undertaken, in selected cases, and when carried out with patience and with a clear perception of its indications. It is applicable to a great diversity of ailments, but it may be stated, in a general way, that chronic female affections, such as persistent pain, constantly recurring congestion, displacements, deformities and fixation of organs, attributable to lack of support or increased weight, peritoneal inflammations and lymph deposits, are the ones which we may hope to benefit most by this method. As opposed to this class, there are also conditions entirely unsuited to such handling. Massage should never be attempted in any acute disease, nor in any acute exacerbation of a pre-existing disease, nor in the presence of pus tubes or pus in any part of the pelvis, nor in cases of pregnancy, normal, or still less, abnormal

or ectopic. The only exception is a retroverted uterus before the third month. Tuberculosis of the peritoneum is another contraindication, also ovarian cystoma, cysts of the broad ligaments, fibroids and malignant growths anywhere within the pelvis.

Massage, in the diseases specified, consists briefly in kneading the pelvic masses, applying friction to them to cause their absorption, and in moving the uterus in different directions to stretch and free its adhesions. The manipulation is carried out with one hand pressing through the abdominal wall and with one or two fingers of the second hand in the vagina. The vaginal fingers are used mostly for lifting up and fixing the uterus or pelvic masses, the manipulation being carried on, for the most part, by the abdominal hand.

CHAPTER IX.

POST-OPERATIVE TREATMENT.

There are certain well-defined principles which may be followed in conducting the after-treatment of a patient upon whom an abdominal section has been performed, the observance of which is of the greatest importance, and the neglect of which may be attended with serious results. After operation the patient is to be removed to her bed, previously made warm, and hot-water bottles carefully placed on each side. One-thirty-second of a grain of strychnine is at once given, and repeated every four hours for the first twenty-four hours; every six hours for the next twenty-four hours, and after that, only if required. It is extremely difficult to lay down definite rules regarding food and drink, as patients respond differently under the same management, and the greatest ingenuity is often required. During the first twelve hours it will be found

preferable to give nothing except small quantities of toast water, or warm water, from one to two teaspoonsful every ten or fifteen minutes; or ten to fifteen drops of sherry in two or three teaspoonsful of soda water, testing the ability of the stomach to retain and absorb it. This frequency of administration is not only tolerated, but is very comforting to the patient, relieving the thirst and diminishing vomiting as well, when present. Ice, as a rule, while grateful to the mouth of the patient, is not as well borne as warm water, and the patient is never satisfied; besides, the injection into the stomach of cold water is apt to cause nausea. The distressing thirst, so often complained of after operation, may be relieved by frequent injections, into the rectum, of half a pint of normal salt solution, and with some it is the practice to inject high up into the sigmoid flexure a quart of this solution, before the patient leaves the operating table. After the first twelve hours small quantities of chicken broth or beef tea, half an ounce every half hour, may be allowed, the time between administrations being extended as the amount given is increased. Albumen water, into which the juice of a ripe orange has been squeezed, is often well tolerated and very comforting. Milk, as a rule, is not a good substance to give by the mouth. It is not easily digested in the stomach, and the thick curds formed are either ejected, or act as an irritant in the intestinal canal. Peptonized milk has not this objection, and, as a rule, is well retained, but many patients object to the peculiar taste. Weak oyster-broth has often been retained with much satisfaction, when other nutriment has been rejected. Small quantities of ginger ale sometimes act as a sedative to the stomach, relieve thirst and flatulence, and are often eagerly demanded by the patient. At the end of the third day the dietary may be increased and administered every two hours. Milk may now be given, combined with lime-water. Such articles of diet as gruel, light thin porridge,

custards, rice, sago, tapioca, thin strips of bread and butter and poached eggs may be gradually added to the list until the eighth or ninth day, when some solids may be introduced.

The arms, legs, and chest may be sponged with warm alcohol, or with soap and water, and subsequently convalescence is promoted by frequent sponging and by rubbing the body with alcohol. If there is much restlessness, or if the patient suffers severe pain, a small hypodermatic of morphia, one-sixth to one-quarter of a grain, may be administered, but the routine employment of it is to be condemned. It is much better to encourage the patients to control themselves and to endeavor to endure the pain. It delays healing, checks secretion and elimination, as well as the peristaltic action of the bowels, functions so much required at this critical time, besides it places the patient in such a mood as to be an unsafe monitor of untoward or alarming symptoms.

Purgatives. It is imperative to obtain a movement of the bowels at as early a period as possible, and it is astonishing to note the great change for the better which takes place when this has been satisfactorily accomplished. If, at the end of forty-eight hours, a good satisfactory movement of the bowels has been obtained, and the pulse below one hundred, the patient is convalescent. If, on the other hand, the bowels remain unmoved, in spite of efforts to open them, and tympany appears, with rising pulse, it is a serious matter. On the second day after operation, an effort may be made to move the bowels, some administering grain doses of calomel every hour until five doses have been given; others recommend teaspoonful doses of Rochelle or Epsom salts every two hours until three doses have been given. Medicines by the mouth for this purpose are, however, often contra-indicated, causing nausea or the upsetting of the stomach. The most satisfactory method consists in the administration,

on the second day, of an enema of warm water and soap-suds, introduced as high up as possible, by means of a rectal tube or large catheter. If the enema is not effectual it may be repeated once or twice at intervals of two or three hours. *Flatulence*, or accumulation of flatus in the bowels, is often a distressing symptom, but generally may be effectually relieved by adding spirits of turpentine to the enema, aided by light massage over the region of the colon. A few drops of tincture of capsicum or of essence of peppermint, in water, will often give material relief. The patient should be *catheterized* shortly after operation, and, if necessary, every six hours afterwards, but she is to be encouraged to attempt to void the urine voluntarily, provided it can be done without much straining. Nearly every patient is restless and suffers more or less pain, which may be relieved by some slight change in position, or by putting a soft pad under the head and shoulders, or under the bends of the knees.

Shock following prolonged, or any operation, can best be treated by keeping up the dry heat to the body and by hypodermatics of whiskey or brandy and strychnine. The routine practice of injections of strychnine, commenced at once after operation, will often prevent the appearance of the symptoms of shock.

Hemorrhage. Indications of collapse, with a falling temperature and rapidly rising pulse, points to this grave danger, and no time must be lost in re-opening the wound and seeking for the mischief, and stimulating treatment afterwards pursued by every effort known. Great benefit will be derived from rectal injections of normal salt solution, but more particularly from injections of the same solution into the pectoral region by means of a small aspirating needle attached to an ordinary enema syringe. Large quantities can thus be injected, if rigidly persisted in. The vomiting, due to the anæsthesia, should be over at the end of eighteen or twenty-four hours, but sometimes it

persists longer and becomes a most troublesome symptom. When vomiting continues after the third day, especially when the fluid is expelled without much apparent force, peritonitis is to be feared. Under the circumstances nothing is to be given by the mouth whatever, but rectal enema of peptonized milk or beef tea and the white of egg may be given instead. To allay thirst and dryness of the mouth it may be frequently rinsed out with cold water.

As a rule the patient should not be allowed to sit up in bed until the eighteenth day. At the end of the third week she may be allowed to get out of bed, and at the end of the fourth week, allowed to walk, but before doing so she should be furnished with an abdominal bandage, to prevent any opening of the incision, to be subsequently followed by a hernia.

The after-treatment of plastic operations for the repair of the perineum or cervix resolves itself into rest and cleanliness. The patient should remain in bed for two weeks, and after that should take another week in getting up and about. If a gauze tampon has been introduced into the vagina, it should be removed after forty-eight hours, and a warm sterile water douche given daily.

Two aloin, strychnine and belladonna granules may be administered on the second evening after operation, followed by a rectal enema in the morning.

CHAPTER X.

GYNÆCOLOGICAL APPLICATION OF ELECTRIC CURRENTS.

But two currents may be said to be in use in gynæcological therapeutics; the *galvanic* or *direct* current, and the *Faradic*, *induced* or *interrupted* current.

The articles considered necessary for the application of the galvanic current are, a *battery*, composed of from

forty-five to seventy Leclanche cells, set up "in series," or the supply terminals of an incandescent electric light current. A *current controller*, such as the Massey, or some reliable *rheostat*, to regulate or turn off or on the current; a *galvanometer*, indicating from 1 to 500 milliamperes; *rheophores* or flexible metallic cords, for conducting the current; various forms of *electrodes* for its application, and a *commutator* or *pole changer*. Instead of such a bulky battery, many will doubtless prefer a portable one, excellent varieties of which are to be found in most instrument shops. Electrodes, when in use, are distinguished by the terms "positive" (anode) and "negative" (cathode), the former receiving its name from being attached to the first carbon, and the latter from its being attached to the last zinc of the battery. They are also distinguished by the terms, "internal" and "external," according to the locality to which they are applied.

Various forms of intra-uterine electrodes are in use. They are made of platinum, occasionally of copper or zinc, shaped like a Simpson's sound, and so insulated as to expose only a small portion of the distal end. The external, cutaneous, or dispersing electrode is composed of a large, flat, conducting surface. There are several varieties. Apostoli uses moistened sculptor's clay; Engelman, a flexible plate of lead, six by seven inches, and

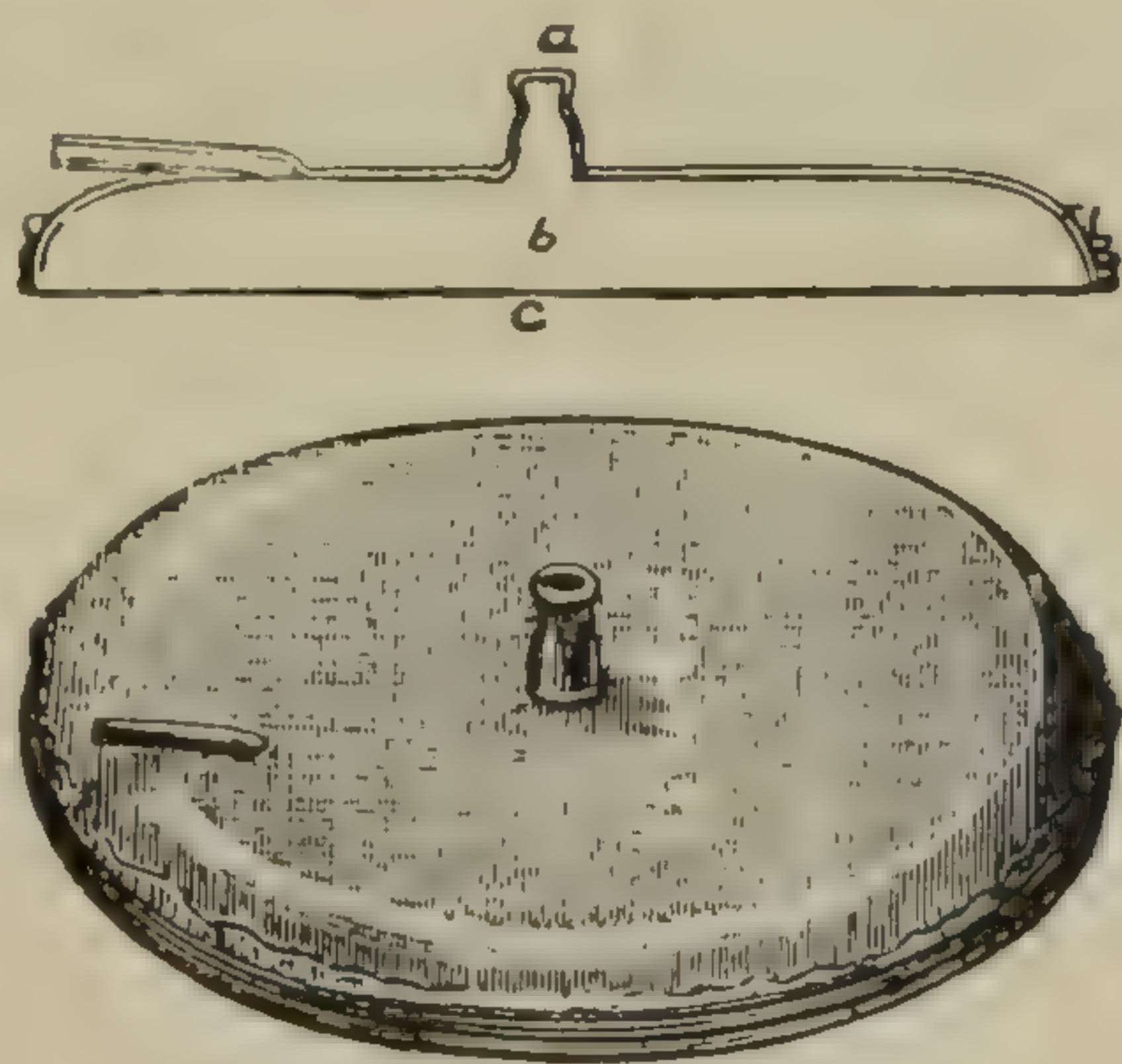


FIG. 37—Martin's cutaneous electrode.

Martin, a large concave plate, covered with a membrane and capable of containing warm water. This electrode is usually applied to the abdomen, sometimes to the back. By using large and wet electrodes, we chiefly get the interpolar effect, which is that of electrolysis. By using small and dry electrodes, we chiefly obtain the polar effect,

which, when the current is strong enough, becomes chemical cauterization.

By combining large wet electrodes on the skin with small dry electrodes in the uterus, burning of the skin is avoided and chemical cauterization of the uterus obtained. The two poles of the battery have different physical and physiological effects. The positive pole attracts acids, while alkalies collect at the negative; the eschar produced by the positive pole is dry, that by the negative is softer and larger and allows the galvanic current to penetrate through it; the negative pole has a stimulating effect and will draw blood to the parts, the positive pole has a depressing, anti-congestive power, and will dispel it; the negative pole causes pain, the positive allays it; the positive pole has an escharotic drying effect, the negative a softening, liquefying effect.

The Faradic current is produced by leading the electricity, generated in two or three Leclanche cells, through a short coil of coarse insulated copper wire, called the primary coil, in such a way that the current is broken and closed at short intervals. Outside the primary coil is another, called the secondary coil, which consists of a much longer and finer one of insulated copper wire. The current passing through the primary coil is called the primary current, and that induced in the secondary coil, by means of the primary current, is called the secondary current. Both currents produce muscular contraction, but the secondary, producing the effect in a higher degree, is more generally used. With this current, in addition to the electrodes already mentioned, bipolar intra-uterine and vaginal electrodes are used by which the effects of the current are centralized.

Practical application. Amenorrhœa of the functional type is one of the affections in which we may hope for the greatest amount of good. Both the galvanic and the Faradic may be used alternately in this condition. Mild

galvanic currents act best, from fifteen to twenty milliamperes. The positive pole is to be placed over the abdomen by means of the large electrode, and if a virgin, the negative may be applied, by means of a smaller electrode, over the perineum, or if she has borne children or is married, it is to be placed in the uterine cavity. For the application of the Faradic current the bipolar vaginal and intra-uterine electrodes may be used alternately.

Stenosis of the uterine canal, such as congenital pin-hole os externum, spasmodic contraction of the internal os, without apparent disease, stenosis due to sharp flexion forward or backward, are amenable to galvanic treatment. The negative pole is to be applied to the constricted part and the large positive pole to the abdomen for ten or fifteen minutes, with a power of fifteen to twenty milliamperes.

Galvanism is also useful for almost every form of *dysmenorrhœa*. Here the best results will be attained by the introduction of the positive pole within the uterus, because most painful menstrual states are attributable to congestion in that region. The membranous form yields better to curettage, but if galvanism is to be employed, the negative pole in the uterus gives the best results.

In *subinvolution*, depending upon a low grade of inflammation of the uterine tissue, in which the uterus has engorged vessels with inactive muscular structure and a

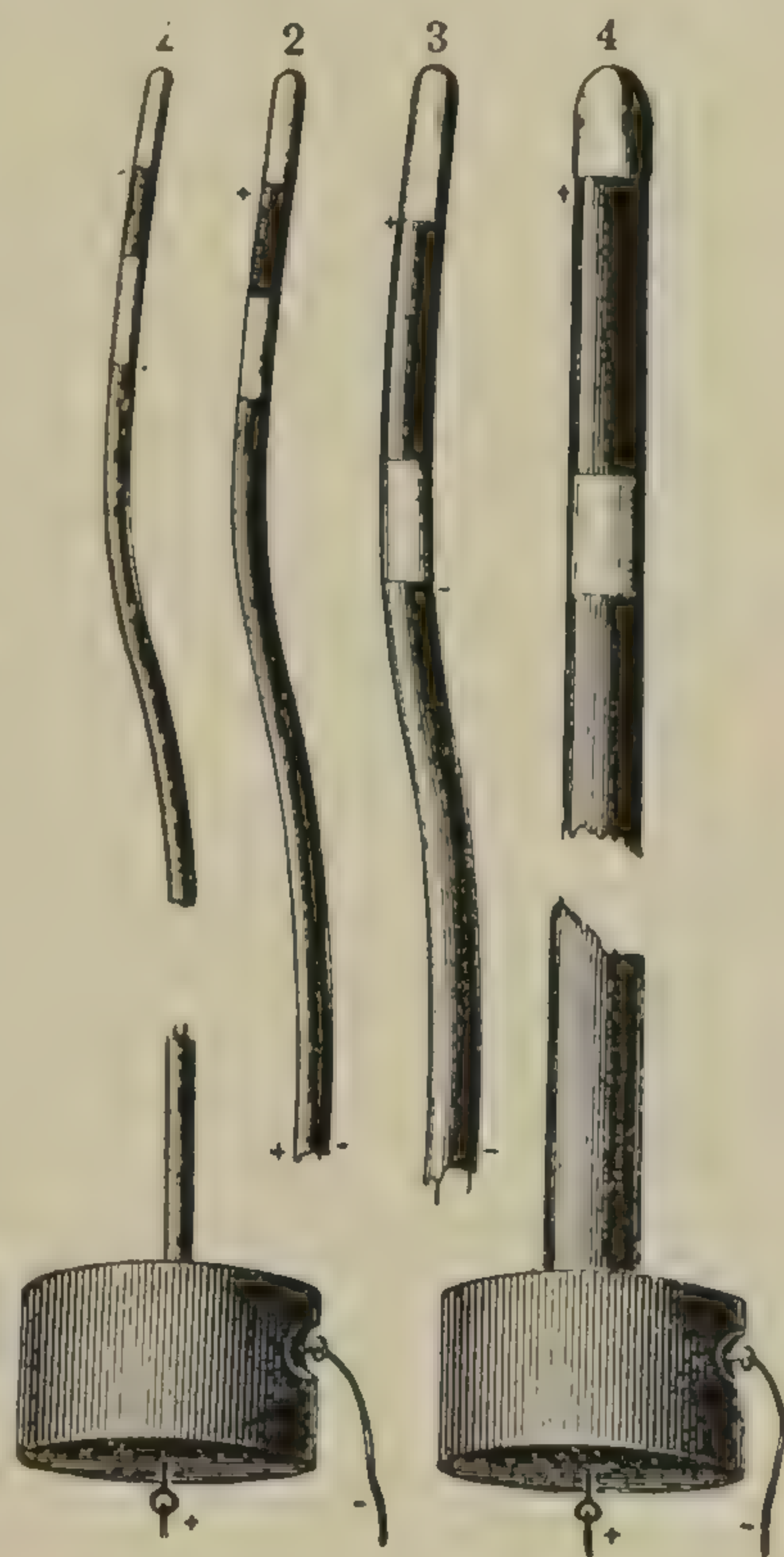


FIG. 38.—Apostoli's Bi-polar Uterine and Vaginal Exciters : 1, small uterine ; 2, medium uterine ; 3, large uterine ; 4, vaginal, used in the uterus after confinement.

certain amount of lymph thrown out, considerable assistance may be obtained from the use of the Faradic current; one pole in contact with the cervix, the other over the abdominal or lumbar region.

In *subinvolution*, in connection with injuries during parturition, notably of the cervix, and in connection with tubal and ovarian diseases and pelvic exudates, the galvanic current, with the negative pole within the uterus, must be utilized. Fifty or sixty milliamperes of this current, applied for fifteen or twenty minutes, twice a week, will soon soften the uterus and render it capable of absorbing, as well as promoting the absorption of pathological products of long standing.

Endometritis. In the simple catarrhal form, with hypersecretion of the uterine follicles, and from frequent repetition of which the uterus has become chronically enlarged, the Faradic coil will cause the organ to regain its tone, and its nutrition may be improved by frequent and mild applications of the galvanic current, the positive pole being intra-uterine. In the hemorrhagic, or fungous form, recourse is to be had also to the positive galvanic pole, seeking to bring it in contact with the entire surface.

Plastic exudation. Good results often follow the adoption of this treatment in old parametric and perimetric exudates, but a careful diagnosis that pus is not present somewhere, must be made, before proceeding to its use. The positive ball electrode, covered with chamois or clay, is to be placed within the vagina and the large electrode over the abdomen. Beginning at zero, the current is to be worked up to forty or fifty milliamperes, and continued at that point for ten or fifteen minutes. The treatment is to be repeated twice a week.

Catarrhal Salpingitis. The positive electrode is to be pushed up as far as possible into the uterine cornu and a

moderate galvanic current of twenty to thirty milliamperes, for ten to fifteen minutes, turned on.

In *chronic congestion of the ovary*, without decided degeneration, the positive ball electrode is to be placed in the vagina or rectum, as near as possible to the enlarged ovary, and a moderate current of ten to twenty milliamperes, for ten minutes, applied.

Orarian and pelvic neuralgia. There are certain pains in the region of the ovaries and deep within the pelvis which are found difficult to associate with disease, but which are more likely samples of reflex neuralgia. In such cases electricity may be used to great advantage. First of all, use bipolar faradization with the fine wire coil, gradually increasing the strength, then changing to the coarser wire coil, until the parts either become benumbed or free from pain.

Uterine fibroids. Before attempting electrical treatment in such cases, a positive diagnosis must be made of their position, whether sub-peritoneal, intra-mural, or sub-mucous, and of their quality, whether hard, or of the soft, œdematous variety.

Sub-mucous pedunculated fibroids will be benefited by the treatment, only by being forced out of the uterus, and care should be taken not to devote much attention to sub-peritoneal fibroids. Of the different varieties, the myo-fibromata are the ones for which the most good can be accomplished. Next in order stand the pure fibromata, but the durable effect, when once produced, will be the most marked in the fibromata. The first variety will require small amounts of galvanism frequently repeated, the latter will call for high intensities and short sittings.

The application of galvanism to *soft œdematous tumors* should be avoided, as it often stimulates them to new growth, or promotes a tendency to break down into fluid spaces.

Fibro-cystic tumors also forbid the use of the galvanic current, on account of their poor vitality, and their liability to break down and produce systemic poisoning.

The cases reported, in which fibroid tumors are said to have disappeared, are rare considering the number treated. In the large majority there is a perceptible diminution in size which persists for a longer or shorter period. For the application of the galvanic current to uterine fibroids, the large flat electrode is placed over the abdomen and the intra-uterine pole to be used will depend upon the results desired. The positive pole is to be used when it is desired to affect the mucous membrane especially, and to arrest hemorrhage; the negative for electrolytic treatment. For the escharotic effect, thirty to fifty milliamperes during ten minutes and repeated a few times, will usually be sufficient. For electrolytic treatment the power is to be gradually increased up to the extreme limit which the patient will bear. Five to ten minutes will be sufficient, and the time for the repetition will be determined by observing the effect upon the tumor and upon the patient's general condition.

Ectopic gestation. Both the Faradic and galvanic currents have been recommended to destroy the life of the foetus previous to the fourth month. With the present knowledge of the extreme dangers surrounding ectopic gestation, increased often to their greatest intensity by even the slightest manipulation, it can scarcely be considered safe to submit a patient to the manipulation necessary for the application of either current.

Cœliotomy is a much safer procedure, and consequently the use of the electric current can only be considered justifiable in localities far remote from skilled hands, or where removal or delay means grave danger, or in cases where the patient positively refuses to submit to cœliotomy.

PART TWO.

FUNCTIONAL DISEASES.

CHAPTER XII.

DISORDERS OF MENSTRUATION.

Abnormal changes in the menstrual flow are to be regarded only as symptoms which have their origin often in opposite conditions and require discrimination in their treatment. The menstrual flow may be absent (*amenorrhœa*) or scanty; it may be painful (*dysmenorrhœa*); or it may be profuse (*menorrhagia*). When the hemorrhage is profuse at other times than at the menstrual period, it is termed *metrorrhagia*.

AMENORRHŒA.

Amenorrhœa, or absence of the menstrual discharge, is termed *primary*, when the patient has never menstruated, and *secondary*, when menstruation has previously occurred.

Primary amenorrhœa may be divided into (a) *primary permanent amenorrhœa*, the most marked cases being those in which the ovaries, or uterus, or both, continue in a rudimentary condition, or are altogether absent, while the external genitals are normally formed. (b) *Primary temporary amenorrhœa* may be due to chlorosis occurring in girls under the age of puberty. Menstruation occurs later than normal, and, when it does set in, the flow is scanty and of short duration. (c) *Delayed puberty*. Here the general and sexual development is complete, yet the girl fails to menstruate. It is often caused by overwork, combined with insufficient food, by change of

climate or habits at about the expected period, or by too long confinement during school hours, combined with an over-taxed brain.

Secondary amenorrhœa may be due to constitutional derangements, as anæmia, chlorosis, diabetes, Bright's disease, malaria, cancerous cachexia, tuberculosis, or acute illnesses, or it may be due to the influence of the nervous system, such as severe mental shock, alarm or sudden fright, or by the nervous system generally being overtaxed. Among other causes may be mentioned obesity, change of climate, sea voyages, and sudden or prolonged exposure to cold, particularly at the menstrual period; or it may be due to acquired atresia of the cervix, or of the vagina. Removal of both ovaries does not always lead to complete amenorrhœa, some women continuing to menstruate for years after their removal. There are different explanations given, among which may be mentioned, the existence of a supplementary ovary, by a portion of the ovary being left in the pedicle, and by the law of "persistence of habit."

Symptoms. Besides the absence of the periodic flow, which is of course the chief symptom, there are other symptoms to be taken into consideration, and which are for the most part those of the primary disease causing it.

When a case of amenorrhœa presents itself, it should definitely be settled whether it is primary or secondary. Primary amenorrhœa, in which the menstrual flow has never occurred, leads to questioning whether the uterus, tubes, and ovaries be present in their entirety. If present, it becomes necessary to ascertain whether atresia of the cervical canal, vagina, or vulva exists. If the prodromic symptoms of a menstruation be absent, it points to congenital deficiencies, but if the prodromic symptoms have been present, and repeated at lunar intervals, with no menstrual flow, suspicion of atresia is excited. If the case be one of secondary amenorrhœa, pregnancy and lactation must be excluded. When arising suddenly, as for

instance, from taking cold, such symptoms as fever, rather severe headache, pains in the back and pelvis and extending down the thighs, with irritability of the bladder and bowels, generally appear.

Diagnosis. The most important condition from which it must be carefully diagnosed is pregnancy, normal or ectopic. Every sign of pregnancy, particularly the early ones, must be thought of and carefully brought to bear upon the case. Upon this point the practitioner must always be on his guard. Designing women often consult the physician for amenorrhœa, when they know they are pregnant, hoping that something will be done to bring on their courses and thus interrupt gestation.

Treatment. Before any line of treatment can be satisfactorily established, a correct estimate of the symptoms must be made and a conclusion arrived at, whether it is physiological or pathological. If the former, no treatment is needed; if the latter, the treatment will vary according to the special cause and must aim at the correction of the underlying morbid conditions. Hot hip and foot baths are generally useless, unless the function is about to appear. It is not uncommon for the menstrual function to be delayed for one or more years, or to be irregular, or suspended, for the first few years after its commencement, and hence no special remedy is needed, except attention to hygiene, diet, dress, exercise, and baths. The uterus, in such cases, being imperfectly developed, time must be allowed for its normal growth. *Acute suppression*, such as that arising from cold, is best treated by rest in bed, a hot sitz bath every six hours, with a warm water vaginal douche at the same time, and by the administration of a laxative. Hot water bags applied to the abdomen and lumbar region, pediluvia with mustard and water assist frequently in giving relief. The use of the so-called direct emmenagogues, as rue, savin, and cantharides, is objectionable. The uterine function should never be forced

when the general system is struggling for existence; besides very few remedies have any direct stimulating effect on the lining membrane of the uterus. Amenorrhœa from malaria calls for the administration of *quinine* and change of climate. Rheumatic amenorrhœa sometimes calls for the *salicylates*. *Cimicifuga* and *guaiacum* are excellent remedies for rheumatic amenorrhœa, but especially for delayed or painful menstruation. *Pulsatilla* is indicated when the menses have been stopped by mental shock or fright. *Apiol* is one of the most safe and efficient emmenagogues, and may be given in capsules containing five or six drops, three times a day, for a few days preceding the expected flow.

Aloes indirectly stimulates the internal genitalia, and is one of the best adjuvants to other treatment when constipation exists. *Strychnine* is a good muscle and nerve tonic, and will assist the action of iron. *Iron* is the hæmatic tonic, and stands first. It has an emmenagogue action, increasing the blood supply of the pelvic organs, and may be administered in any one of the recognized forms, such as the dried sulphate, the carbonate, the muriated tincture, either plain, or in the form of elixir or glycerole. The citrates, tartrates, lactates, peptonates, or other mild preparations are useful, but not so rapidly efficient. The therapeutic effect of any of these can often be improved by the combination of a small dose of liquor potassæ arsenicalis or liquor arsenici hydrochlor. Blaud's pill, composed of sulphate of iron and carbonate of potash, or the modified pill which contains arsenious acid as well, often gives excellent results.

Among the various combinations the following are the most generally serviceable :

R.	Aloin, grs. xii;	
	Pil. Ferri Carb., drams iss;	
	Myrrh, dram ss;	M.
	Ft. pil No. XL.	
Sig.—	Take two pills, three times a day, after meals.	

R. Ferri Sulphat., Exsiccata., grs. xl;
 Quiniæ Sulphat., grs. xl;
 Strychniæ Sulphat., gr. i;
 Ext. Gentian, q.s. M.
 Ft. pil No. XL.

Sig.—Take one pill after meals.

R. Ferri Sulphat., dram i;
 Potass. Carb., dram i;
 Quiniæ Sulphat., dram ss;
 Ext. Nunc. Vom., grs. iv;
 Aloin, grs. iv.
 Ft. pil No. XL. M.

Sig.—Take one to two after meals.

R. Tinct. Ferri Mur., drams v;
 Liq. Arsen. Mur., dram i;
 Acid Mur., C.P. dram i;
 Syrup Simplicis, ad., oz. viii. M.

Sig.—Dessertspoonful, in wine glass of water, after meals.

Potassium permanganate or *binoxide of manganese* sometimes very efficacious, when administered for a few days preceding menstruation, but the former often has a distressing effect upon the stomach. The local use of electricity is the most reliable of all emmenagogues, being the most direct uterine stimulant we possess. It is well adapted to stubborn, long continued cases, which have resisted hygienic and medicinal treatment, more particularly when the uterus has been found small and ill-developed, or has been atrophied from superinvolution or chronic metritis, or in cases in which the internal genitalia have been found markedly dormant and atonic.

Vicarious menstruation is a condition closely allied to amenorrhœa. It means a condition of the female system in which there is a regularly recurring discharge of blood from other parts of the body besides the uterus. The sanguineous flow may come from the nose, bronchial tubes, stomach, intestines, or rectum; generally it comes from a mucous surface, but it may take place from the skin or at the site of a wound. The treatment applicable is that adapted for amenorrhœa.

MENNORRHAGIA AND METRORRHAGIA.

The first of these two words is used to express an excessive menstruation; the second, for a flow of blood not only at the menstrual time but between menstruations. Neither condition is a disease, but a symptom of some well-defined pathological condition. Women vary greatly within the physiological limits in the amount, the duration, and the frequency of menstruation, and it is thus difficult sometimes to say where normal menstruation ceases and menorrhagia begins. Menorrhagia may occur as an excessive flow of blood during the normal number of days, or an ordinary flow extending over an excessive number of days.

Causes. Hemorrhage associated with abortion, myomatous degeneration of the chorion, placenta previa, retained membranes, and the like, are not to be considered as having a place under this heading. Women of hemorrhagic diathesis bleed more freely at the menstrual epochs. Hæmophilia, scrobutus, and purpura act in the same way. Chlorosis, as a general thing, tends to amenorrhœa, but in some cases it leads to menorrhagia and metrorrhagia. Many other conditions dispose to it, as long-continued mental depression and other nervous disturbances, luxurious living and sedentary habits, residence in tropical climates, malaria, tubercle, the acute exanthemata, lead and phosphorus poisoning, and Bright's disease.

It may be associated with disorders of the circulation, such as mitral incompetence or stenosis; congestion, from any cause, of the portal circulation; renal or splenic disease; abdominal tumors, or even overloaded bowels. The chief local pelvic causes are ovarian, uterine, and peri-uterine congestions and inflammations; tubal inflammatory diseases; the earlier stages of chronic metritis; subinvolution; chronic endometritis; cervical lacerations; displacements; uterine fibroids and polypi.

One of the most common causes is the presence of fungosities within the uterine cavity; and malignant diseases of the uterus is almost invariably followed by menorrhagia and metrorrhagia. Many women firmly believe that the menopause must be attended by an excessive menstrual flow. Such is not the case; after the menopause has once been established, post-climateric hemorrhages are almost invariably due to a local lesion, such as senile catarrh, cancer, or the presence of mucous or fibrous polypi.

Treatment. The treatment of menorrhagia resolves itself into that appropriate for the attack, and that for the menstrual interval. Rest in bed, in the recumbent position, should be insisted on, light non-stimulating diet, the rectum unloaded and the bowels kept open. Chronic constipation, particularly when associated with congestion of the portal circulation, is to be overcome by a pill of podophyllin and nux vomica at night, followed, in the morning, by a teaspoonful of some saline, such as effervescing granular phosphate of soda, or a wineglassful of Hunyadi Janos water.

The medicinal hemostatics to be used must depend upon the provoking cause. In moderate, persistent, erratic hemorrhage, particularly where the fault lies in the heart's action, or in a retarded venous circulation, *digitalis* is one of the best remedies. It operates by increasing the arterial tension and thus improves the atonic circulation. *Ergot* is singularly well adapted to conditions of the uterus in which there are well developed, but relaxed muscular fibres, with dilated and engorged blood vessels. The more soft, flabby, relaxed and engorged with blood the uterus is, the more pronounced will be its effects, hence it is particularly indicated in chronic hyperæmia, active or passive; in chronic metritis, in its first stage, and in subinvolution. *Hamamelis*, in the form of fluid extract, is a most useful remedy. For sudden outbursts and for active and profuse

hemorrhage it is inferior to ergot, but for a slow long continuous flux, or hemorrhage passive in character, it is the remedy *par excellence*. The fluid extract of ergot and hamamelis make an efficacious combination. *Hydrastis Canadensis* is a vaso-constrictor in congested states of relaxed mucous membrane and for uterine hemorrhage, due to endometritis, myomata, or incomplete involution, it is very valuable. It also combines well with ergot. A neat way of administering is in the form of *hydrastine*, given by the mouth or hypodermatically in a ten per cent. solution.

The following combinations have been found very serviceable:

R. Gallic acid, dram i;
 Ergot, Fluid Extract, oz. ss;
 Acid Sulph. Aromat, drams iiss;
 Elixir Simplicis, ad., oz. viii. M.

Sig.—A tablespoonful in some water every four hours.

R. Ergot, Fluid Extract, oz. ss;
 Hamamelis, Fluid Extract, drams iii;
 Tinct. Hyoscyam, drams iiss;
 Elixir Gentian Co., oz. i;
 Aquæ, ad., oz. viii. M.

Sig.—A tablespoonful in some water three times a day after meals.

Tincture Digitalis, drams iiss, may be combined with either of these, should the indications call for it.

The action of medicinal agents should be supplemented in severe cases by local applications. Hot water may be injected into the vagina, and when the patient has become deeply anæmic from loss of blood, normal salt solution may be injected into the rectum. The best non-operative means is the vaginal tampon. The vagina and cervix may be tamponed with absorbent cotton after the hot water irrigation and allowed to remain there for twenty-four hours. During the intervals, the judicious and thorough use of the curette is one of the best means of promptly and safely curing many of these cases.

Local galvanization of the uterus is a therapeutic agent worthy of the highest consideration in uterine

hemorrhage dependent upon uterine fibroids and chronic affections of the endometrium. Faulty conditions of the blood from anæmia, chlorosis, or defective hygiene, are to receive special care. *Iron*, in the form of the *muriated tincture*, forms an excellent means for checking excessive menstruation dependent upon marked anæmia; however, in most causes it is to be utilized only during the menstrual interval. *Arsenic* is a most valuable hæmostatic in the menorrhagic conditions of young girls, as well as of women nearing the menopause. At such times, if too profuse, too frequent, or continues too long, it is best met by administering three to five drops of liquor potassæ arsenicalis three times a day. It seems to be indicated when iron is contra-indicated, and may be given during the time of the flow as well as during the interval. A generally favorite prescription is known as the combination of the sulphates.

R. Magnesiae Sulph., drams vi;
 Quiniæ Sulph., grs. xxv;
 Ferri Sulph. Exsiccât, grs. xl;
 Acid Sulph. Aromat., drams iiss;
 Aqua Menthæ Pip., ad., oz. viii. M.

Sig.—A tablespoonful in a wineglass of water after meals.

R. Pulv. Ferri Redact., grs. xl;
 Quiniæ Sulph., grs. xl;
 Acid Arseniosi, grs. i;
 Extract Gentian., qs. M.
 Ft. pil No. XL.

Sig.—One pill after each meal.

Precocious menstruation is a regular lunar flow of blood from the genitals every four weeks, occurring in children below the age of puberty. As a rule, both the external and internal genitals and the breasts are abnormally developed in such children, and sometimes they show sexual appetite. Nothing can be done for them except to keep up their strength, and such other treatment as will make up for the loss of blood, until they have reached the proper period.

DYSMENORRHŒA.

Dysmenorrhœa means difficult or obstructed menstruation. It is one of the most common of the various menstrual derangements, and manifests itself by pain, which varies greatly as to frequency, duration, time and severity. It may properly be divided into the following varieties:—The *neuralgic*, the *congestive* or *inflammatory*, the *obstructive*, and the *membranous*. To this classification the *ovarian* has been added by some authorities. It differs from the others more in location than in kind, and it can scarcely be said to deserve recognition separate from the inflammatory.

Spasmodic dysmenorrhœa is a term applied to the neuralgic form, in which there is spasm of the circular fibres about the os internum.

Neuralgic dysmenorrhœa. This variety does not depend upon any appreciable organic disorder of the uterus or of its appendages. Ordinarily, on the most careful physical exploration, no alteration in size, shape, position, consistency, or vascularity of the pelvic organs or structures will be noticed. The sentient nerves of the endometrium appear to be in a state of hyperæsthesia—a neuralgia in the ordinary sense of the term.

Causes. There are many agencies which, at times, so alter the healthy state of the nerves as at one time will produce a gastralgia, at another an occipital or facial neuralgia, and similarly in neuralgic dysmenorrhœa there is present a local neurotic state, provoked to the excitation of pain by the stimulus of the physiological congestion incident to the oncoming menstruation. The causes which generally induce it are: The neuralgic diathesis, hysteria, chlorosis or plethora, malaria, gout, rheumatism, luxurious and enervating habits, and habits deteriorating the nervous system.

Symptoms. It is by far the most frequent variety, and is found oftenest in those who are subject to the various

neurotic diseases. The pain may show itself before the flow has been established and disappear as soon as it comes on, or may continue with varying intensity throughout the duration of the menstrual discharge. The pain is located in the uterine or ovarian regions and radiates towards the iliac, abdominal, lumbar, or sacral region, or down the thighs. The discharge may be scanty or profuse, and the severity of the pain seems to be in inverse proportion to the quantity of the flow. The diagnosis is made by the exclusion of the other varieties. The pain felt in the uterus has nothing expulsive in its character, the flow is steady and not interrupted, no clots are discharged by spasmodic efforts, and physical examination discovers no obstruction. These facts will distinguish it from obstructive dysmenorrhœa. It is differentiated from the congestive form by the absence of constitutional disturbance and by its being habitual and not exceptional, by the absence of the ordinary signs of endometritis and of ovarian and peri-uterine inflammations.

The *treatment* resolves itself into that which is appropriate for the time of the flow, to relieve pain, and that for the interval, to remove the cause and prevent its repetition. If the rheumatic or gouty diathesis exists, it may be combated by administering half dram doses of the ammoniated tincture of guaiacum, by twenty drop doses of the wine of colchicum, or by five to ten grains of soda salicylate, three times a day. In anæmic and neurasthenic cases ferruginous and nerve tonics such as iron, nuxvomica, phosphorus, quinine, cod liver oil, malt extracts, and the hypophosphites should be given, and the strictest attention to general hygiene observed. If plethoric, a strict plain dietary should be demanded, and administration of such purgatives and saline medicines as will favor the portal circulation and deplete the system generally.

Malarial toxæmia should be treated by quinine and change of residence. A sea voyage will often accomplish

excellent results. Local faradization with the secondary current is useful, but often the best results are to be obtained from the galvanic, with the positive pole intra-uterine. For relief at the menstrual period the use of opium and chloral should be forbidden, except under extreme necessity. Phenacetine in five to ten grain doses often gives almost immediate relief. Tincture of cannabis indica, in doses of ten to fifteen drops every four hours while the pain is severe, is also beneficial, and should be tried before resorting to opium or chloral. Apiol, in five drop capsules, given three times a day for a few days before the flow is expected and continued more often during the flow, has done excellent service, especially in the amenorrhœic forms of dysmenorrhœa. Tincture of pulsatilla, given three times a day for at least three days preceding the painful period, is indicated in the neurotic types of the disease, especially in young women. Tincture of cimicifuga, given three times a day during the whole interval and more frequently at the menstrual period, is useful in the neuralgic and rheumatic forms. Viburnum prunifolium, in the form of fluid extract, often gives good results when administered in half dram doses for a few days before the expected period and continued during it. This treatment may be supplemented by hot vaginal douches and the introduction of one-fourth grain suppositories of extract of belladonna.

Congestive or inflammatory dysmenorrhœa. At each menstrual period an active congestion occurs in the mucous membrane of the Fallopian tubes and uterus, as well as in the ovaries, and probably to a less degree in the pelvic tissues. When any abnormal influence renders this excessive, it naturally produces pain in the nerves lying between the distended vessels. This excessive hyperæmia, which may result from a mechanical cause, as a displacement of the uterus, or from a vital cause, as the peculiar condition which we know as inflammation, gives

rise to a variety of painful menstruation which has been styled congestive or inflammatory.

Causes. In a great many cases inflammation of the uterine mucous membrane is the cause of this form of dysmenorrhœa. The existence of disease in this part causes perhaps little pain until aroused by menstruation. It may result, however, from almost any pelvic inflammation which alters the condition of the nerves immediately affected by ovulation or menstruation, or from any cause which exaggerates and prolongs the congestion excited by ovulation. Chief among these may be mentioned general plethora, exposure to cold and moisture, sudden mental disturbance, disturbed portal circulation, displacements of the uterus, fibroids of the uterus, areolar hyperplasia, endometritis, pelvic cellulitis, and peritonitis.

Symptoms. The patient, who has previously menstruated painlessly, is seized during a period with severe pelvic pain, accompanied by diminution or cessation of the discharge and considerable constitutional disturbance. The pulse becomes full and rapid, the skin hot and dry, and with these there is headache, nervousness and restlessness, and occasionally rectal and vesical tenesmus. In cases in which a local inflammation exists, when the flow begins or before that time, the patient suffers from dull, heavy, fixed pelvic pain, which lasts until the process is ended, and even afterwards. If it be due to hyperæmia, the suddenness and constitutional disturbances will mark its difference from the neuralgic and obstructive form, and if it be due to the influence of existing pelvic inflammation, it will usually be marked by pain during the inter-menstrual periods, by difficult locomotion, fatigue after exertion, leucorrhœa, and such like.

Treatment. As in the neuralgic form, the source of the trouble must be sought for and combated along the lines laid down for the treatment of that particular form of disease. General or local plethora must be relieved,

displacements and versions overcome, and if any local inflammation be discovered, it should be the subject of treatment. Should the attack be accidental and due to hyperæmia merely, as from exposure to cold and moisture, the patient had better be put to bed, hot applications applied over the hypogastric and lumbar regions, and a hot vaginal douche administered every four hours. A saline purge is to be given, and a febrifuge mixture composed of the following administered:

R. Tinct. Aconit., dram ss;
 Liquor Ammonia Acetatis, oz. iss;
 Spirit Æther, Nit., drams v;
 Aquæ, ad., oz. iv. M.

Sig.—Dessertspoonful in some water every two hours.

The pain may be relieved by phenacetine or by small repeated doses of Dover's powder.

Should local inflammatory conditions be discovered to be the cause of the dysmenorrhœa, a small cotton tampon, impregnated with boro-glyceride, with or without the addition of a few drops of fluid extract of belladonna, and inserted behind the uterus, will often give marked relief. A five per cent. solution of ichthyol in glycerine applied in the same way will act in a similar manner.

Local applications of heat and vaginal douches will also act as valuable adjuvants. The internal administration of bromide of ammonia, or of tincture of cannabis indica, combined with liquor ammonia acetatis, spirits of ammonia aromat and peppermint water, will have a decided sedative effect, and tend to relieve the congested state.

R. Ammonia Bromid., oz. ss;
 Spts. Ammonia Aromat, oz. i;
 Liq. Ammonia Acet., oz. i;
 Aquæ Menth. Pip., ad. oz. viii. M.

Sig.—Tablespoonful in some water every four hours.

Obstructive dysmenorrhœa. If after the blood has collected in the uterine cavity any obstruction exists to prevent its escape into and through the vagina, spasmodic pains are excited which often amount to uterine tenesmus,

and are very similar to the expulsive pains occurring during normal labor. To this form of painful menstruation the name obstructive dysmenorrhœa has been applied. The obstruction may exist in the cervix or os, in the vagina, or at the vulva.

The special *causes* of obstructive dysmenorrhœa are congenital or acquired contraction of the cervical canal, such as is found in the elongated and conoid infra-vaginal cervix, with pin-hole os, or that form arising from chronic inflammation, especially inflammation resulting from the vicious use of strong caustics. Flexions of the uterus, especially when the angle formed is sharp, will produce it, more particularly when associated with version. Vaginal stricture, either congenital or acquired, will prevent the free escape of blood and produce uterine tenesmus, and in like manner the hymen may produce the same effect. Sometimes a small polypus comes down to the os internum and resting upon it, acts upon the principle of the ball valve, and by so doing produces the worst features of obstructive dysmenorrhœa. A fibroid in the parenchyma of the cervix, by producing tortuosity of its canal, will cause a similar effect.

The *symptoms* are characteristic. After menstruation has continued for some hours, and sufficient blood has collected in the uterus to distend it, a spasmodic pain occurs in the pelvis, increasing into a more or less violent expulsive effort, like the contractions attending a miscarriage. This, in time, causes the passage of a certain amount of blood, the pain then ceases and the patient is relieved, until further distension and obstruction occurs, when the process by which the uterus empties itself is repeated. These symptoms are so marked and decided that little difficulty will be experienced in a diagnosis, but before a decision is arrived at, a careful physical examination should be made, to discover the cause and thus place the matter beyond doubt.

Treatment. The best recognized treatment of ordinary cases of cervical constriction, whether acquired or congenital, is dilatation by means of graduated dilators, or more forcibly by means of Goodell's or some other steel dilator. When the constriction does not exist within the cervical canal, it is usually the result of some severe inflammation following the use of caustics, or of a cervical laceration, and in such cases it may be found necessary to lay open the os by cutting with a knife or scissors. In order to keep the cervix or os patulous, the dilators may be introduced from time to time, but the method is painful and often unsatisfactory. The difficulty may be overcome by at once inserting a glass or aluminum intra-uterine stem pessary and retaining it in place by means of tampons frequently changed, or better, by a Thomas' cup pessary, allowing the pessary to be worn for two or three months. The intra-uterine stem pessary is the best method of treatment, after the canal has been straightened, for constriction arising from flexion. Obstruction, arising from vaginal stricture or obturator hymen, may be overcome by dilatation or incision. Polypi and submucous fibroids in the cervix are to be at once removed.

Membranous dysmenorrhœa. This variety consists in the expulsion from the uterine cavity at menstrual periods, of organized material, which is found to consist of structures resembling the lining membrane of the uterus. It may consist of a sac representing the triangular cavity of the body of the uterus, with its three openings, or it may come away piecemeal, in shreds, or as strips of mucous membrane. When more or less complete it is soft, comparatively thick, and with many perforations, the sites of the utricular follicles. Under the microscope the cast is found to consist of the lining membrane of the uterus hypertrophied in all its elements, almost exactly as in pregnancy, hence it has been termed "menstrual decidua." There are many views held as to its etiology,

but the two main ones are, first, that it is an exfoliation of the entire mucous membrane of the uterine body due to irritation transmitted to it, the result of some ovarian disease. This view is the one most frequently accepted. Second, that it is an exudation, thrown out over the uterine wall, the result of endometritis, and constituting a caste of the uterine cavity.

Membranous dysmenorrhœa may be confounded with early abortion, blood casts or fibrinous moulds of the



FIG. 39.—A Dysmenorrhœal Membrane laid open.

uterus, or with exfoliation of the vaginal mucous membrane. From the first of these, the differentiation may be accomplished by the progress of the case, the repetition of the process, and the entire absence of the symptoms of pregnancy, while the microscope will show the absence of villi of the chorion and of the large irregular decidua cells. Blood clots and vaginal exfoliations will also be readily recognised by the microscope.

Symptoms. With the commencement of the menstrual flow there are steady pains which increase as it progresses

until they become violent and expulsive, like those of abortion. Under these the os gradually dilates and the membrane is forced out into the vagina. There is commonly a tendency to menorrhagia, which however, soon disappears, but for some time after it has passed off there are symptoms of endometritis and purulent and sanguineo-purulent discharges.

Treatment. The uncertainty of the pathology of this disorder has led to a great variety of treatment. For the pain which attends the attack, a hypodermatic of morphia may have to be administered, and occasionally the pain is so severe as to demand the administration of a little chloroform or sulphuric ether, particularly when morphia is not well tolerated. Hot applications and vaginal douches, so useful in all forms of dysmenorrhœa, are also applicable here. If uterine or ovarian disease be detected, it should be treated in accordance with general rules. The largest number of cases successfully treated has followed repeated dilatation and curetting of the uterus, in conjunction with applications of chloride of zinc or carbolic acid, and packing with iodoform gauze. This line of treatment may alternate with galvanization, ten to twenty milliamperes, the negative pole intra-uterine. All varieties of constitutional treatment have been tried and abandoned.

Ovarian Dysmenorrhœa. In a number of cases, by no means small, no disordered condition of the nervous system will be found to account for habitual dysmenorrhœa, and exploration of the pelvis will fail to discover uterine or peri-uterine disorders. By a careful bimanual examination in such cases, a globular slightly compressed mass, about the size of a walnut or small egg, will often be found in Douglas' cul-de-sac, or on one or both sides of the uterus, low down and in close proximity to it. These are the ovaries, enlarged, tender, prolapsed, and revealing a condition known as chronic ovaritis. The pain in this

form of dysmenorrhœa precedes the flow by several days and diminishes as it is established. It is of a dull character, extends over the nates, down the thighs, and is particularly liable to be accompanied by nervous manifestations and depression of spirits. The breasts often sympathize, becoming painful to the touch. It must not however be supposed that in all cases of enlarged, tender, or prolapsed ovaries, ovarian dysmenorrhœa will be found, nor in every case of ovarian dysmenorrhœa that the ovaries will be found in this condition.

The *treatment* of this class of cases is perhaps the least satisfactory of all classes of dysmenorrhœa. In a young girl, in whom ovarian disorder has advanced only to congestion, recovery may rapidly take place, but in a woman further advanced in life, and in whom chronic enlargement of the ovaries has occurred, associated with tenderness and prolapse, the prospects for cure are slight. Sterility in these cases is the rule. It is just in such conditions that bad habits are to be contracted by the use of alcohol, morphia, chloral, or chloroform, and their administration should be avoided as much as possible. Hot applications, warm sitz baths, and warm soothing vaginal injections should be employed. Internally there is no remedy so efficacious as the bromides—ten grains of bromide of ammonia or soda every four hours, commenced a few days before the flow and continued until its close. For the immediate relief of pain, phenacetine, exalgine, cannabis indica, or monobromate of camphor may be employed. Locally, in addition to the hot applications and douches, a boro-glyceride tampon, impregnated with a few drops of fluid extract of belladonna and inserted behind the uterus, soothes and relieves the local irritation and congestion. When unmistakeable evidences of organic ovarian disease exist, the operation for the removal of one or both ovaries is advised as the only means of giving relief.

In treating the subject of dysmenorrhœa, all the varieties generally indicated by authorities have been included, because, by the adoption of this method, a more thorough investigation of the subject is secured, and a recollection of them at the bedside will often aid in the classification and treatment. It must not, however, be supposed that every case of dysmenorrhœa will be subjected to strict limitations, on the contrary, many, if not most cases, give evidence of one or more disturbing elements. As for instance, a retroversion occurring in a weak nervous woman with impoverished blood might cause a dysmenorrhœa, due in part to mechanical obstruction, in part to neuralgia, in part to congestion, and, perhaps to some extent, to a secondary endometritis. In view of this fact, it is well to have in memory some general plan of treatment which may be resorted to in cases not readily susceptible of classification. Hot wet or dry applications to the abdomen and lumbar region, hot vaginal douches, and rectal enemata have a place in the treatment of every form. Medicated vaginal tampons and suppositories aid in allaying congestion, in soothing the pain, and in supporting the uterus and adnexa, and may safely be used in almost every case. The administration of a saline purgative will empty the bowels and relieve portal or pelvic congestion; and for the relief of pain and as a sedative to the nervous system, a judicious selection from the drugs already referred to will often accomplish much of the desired effect.

CHAPTER XIII.

STERILITY, NYMPHOMANIA, VAGINISMUS,
LEUCORRHŒA.

Sterility is another functional disorder of the uterus, and implies an inability for impregnation during normal reproductive life. It is sometimes *congenital*, the result of faulty development. It is said to be *acquired* when it arises from disease after an uncertain period of fertility. A marriage may be unfruitful from causes pertaining to the male or to the female. More women than men are sterile, in the proportion of six to one. Impregnation becomes impossible from absence or a very incomplete development of the vagina; from atresia of the vagina, or from an imperforate hymen. Sterility may occur from a condition of the vulvar orifice, called vaginismus, in which all attempts at coition cause extreme suffering (dyspareunia), the sphincter vaginæ and muscles of the pelvic floor being, at the same time, thrown into a spasmodic state. It may arise from inability of the semen to enter the uterine cavity owing to atresia or stenosis of the os, or to flexions, displacements, or tumors of the uterus. The vitality of the sperm may be destroyed by excessive acidity of the vaginal mucous. There may be incapacity for proper ovulation, which includes any condition of the ovary which impairs the ovule, such as chronic ovaritis and cystic degeneration; from imperfect development of the ovule, the result of debilitating diseases as anæmia, scrofula, tuberculosis or syphilis. Gonorrhœa, it matters not how contracted, is a very common cause. Sterility may be owing to organic changes in the Fallopian tubes, which prevents the safe passage of the ovum through them; to pelvic peritonitis, which prevents an instinctive application of the fimbriæ to the ovaries; to inability, after fecundation, to continue gestation; or, finally, to want of physical adaptation of the parties, "sexual incom-

patability." Married life may be sterile for years, yet when either party obtains a new companion fertility may follow.

Treatment. While judicious treatment occasionally gives favorable results, it often terminates in disappointment. Success in the management of sterility depends largely upon a correct diagnosis, and the special treatment of all varieties consists in the removal of the cause, if practicable. In all cases of long-continued sterility, after having thoroughly examined the female without finding a satisfactory cause, investigation should commence with the male. If the uterus is absent or small, less than an inch or an inch and a half in length, all efforts to ensure fertility would seem hopeless. An ill developed uterus may be stimulated to growth if the patient is young and healthy. Excessive acidity of the vagina may be overcome by the use of alkaline waters internally, and by vaginal injections of weak solutions of carbonate of potash prior to coitus.

Nymphomania. When the sexual feeling in the female is excessive or perverted it is called nymphomania. There is a mental perversion, attended by an uncontrollable sexual passion, which, in its most severe form, is often associated with or dependent upon certain varieties of insanity with or without gross brain disease. Although observed in children and octogenarians, it occurs most frequently at the beginning and at the end of menstrual life. There is the greatest perversion of the sexual act, gratification being sought not only in masturbation, but also with others of the same sex. In many instances the disorder is a reflex manifestation arising from irritation of the genital organs, or from certain diseases of the uterus and appendages. The exciting causes may have their origin in the intestines, especially in the rectum, such as by the presence of worms or hemorrhoids. Inflammation of the vulva, vagina, urethra, bladder, or the

irritation of diabetic urine may give rise to it. Nymphomania may also result from frequent masturbation as well as cause it.

Treatment. The best results are obtained by moral suasion. Occupation of the mind and free physical exercise in the open air, early rising, cold bathing, regularity of the bowels, a plain non-stimulating diet, and the internal administration of the bromides, are the best remedies. When local disease is suspected, it is to be sought for and treated. Clitoridectomy and oorphorectomy have been tried and have failed to effect a cure, and such operations are indicated only when incurable disease of the external genitals or ovaries respectively perpetuate the condition.

Vaginismus. Vaginismus consists of hyperæsthesia of the vulvo-vaginal orifice and neighboring parts, accompanied by abnormal and painful contraction of the muscles of the pelvic floor. It is not a disease in itself, but a symptom of various morbid conditions of the vulva, vagina and the surrounding parts, among which may be mentioned urethral caruncle, erosion, inflammations or fissures of the vulva or hymen, rectal fissures, cervical lacerations, and uterine and ovarian displacements.

Treatment. The cause of the local irritation is to be removed and the general health improved. Gradual dilatation may be practised by introducing a series of dilators, a larger dilator being used and allowed to remain for a longer period each succeeding day. Forcible dilatation, under an anæsthetic, may be practised, after which a good sized glass or hard rubber dilator is to be inserted and allowed to remain for several hours.

LEUCORRHŒA.

By the term leucorrhœa is meant a "white flow," but, in the ordinary acceptation, it is used to designate any discharge, other than blood, coming from the genitals,

although at times the leucorrhœal discharge may have a sanious admixture. In its normal condition the genital tract is just moist enough to be soft and well lubricated. For a day or two after menstruation many women have a slight increase of moisture, but any decided increase, whether mucous, serous, or purulent, is abnormal and constitutes in itself, if not a disease, a symptom of one, and one often of much importance. The discharge may come from the vulva, the vagina, the cervix, or the interior of the uterus. It may be colorless, white, yellow, green, red, or brown. It may be nearly as thin as water, or more or less thick, like cream or soft cheese. Leucorrhœa may be *idiopathic* or *symptomatic*. It is called idiopathic when it is not traceable to any definite disease, or pathological condition, or to any permanent structural anatomical lesion. It is found often in young and anæmic girls, in those of sedentary habits, or in those whose employment compels them to remain standing upon their feet for hours. It may be induced by anything that weakens the constitution, such as protracted lactation, bodily or mental fatigue, emotions, especially of a depressing kind, and is often found in persons predisposed to pulmonary phthisis. Like other catarrhal affections, it may be due to exposure, or to residence in a damp climate; or it may be induced by local irritation, such as masturbation or frequent coition; or it may appear in consequence of amenorrhœa or scanty menstruation.

Symptoms. Apart from the discharge, which, as a general thing, is of a whitish color as it appears at the vulva, there are often other leading symptoms. The patient is often anæmic, has a pale, worn, tired, or pinched look, and a feeling of general weakness. The appetite is poor and the digestion impaired, giving rise to flatulence and gastralgia or enteralgia; constipation and an irritable bladder are frequently present. Backache is a characteristic symptom. The patient complains of a dull heavy

pain over the sacral region, or at the tip of the coccyx, which may be continuous or may be brought about by long standing or other fatigue.

Treatment. From the symptoms described it will be readily seen that general and local treatment must go hand in hand. The more the condition depends on constitutional causes, the more general must be the treatment. Strict attention must be paid to general hygiene. Plain substantial food that the stomach can readily digest must be taken, and the bowels kept open by some mild aperient, such as a pill of aloin, strychnine and belladonna. Tonics, particularly the ferruginous and nerve tonics, are here indicated, and an emulsion of cod liver oil is often well borne, helping to build up the system. Such internal remedies as hydrastis and cimicifuga seem to have the special virtue of checking leucorrhœa. Warm hip or tepid general baths are to be recommended, and night and morning a vaginal douche of hot water, followed immediately by a warm astringent solution, may be used. In many cases treatment carried out on these lines will suffice to effect a cure, and is especially to be tried in intact girls, before resorting to or suggesting a physical examination.

Symptomatic leucorrhœa. Leucorrhœa is a symptom of numerous local diseases of the genitals, such as vulvitis, vaginitis, specific or otherwise; endometritis; metritis; subinvolution; erosion of the os; lacerated cervix; polypi; fibroids, or carcinoma. When even a mild leucorrhœal discharge has resisted treatment for a considerable length of time, or in cases in which the amount of discharge, or its color or consistency, points to the presence of a local disease, no time should be lost in making an examination, and in treating the cause according to the pathological conditions found to be the chief factors in the production of the leucorrhœa.

PART THREE.

DISEASES OF SPECIAL REGIONS.

CHAPTER XIV.

DISEASES OF THE VULVA.

Malformations. 1. *Absence of the vulva.* By an arrest of development in the first month of foetal life, the external genitals and anus may be absent, the skin covering the region uninterruptedly. If the anus is formed life may be continued without the external genitals, the urine being evacuated through the navel.

2. *Hypospadias.* In consequence of insufficient closure in the median line, the lower wall of the urethra may be split more or less deeply. If the defect extends very deeply so as to divide the different sphincters of the urethra the patient cannot retain the urine.

3. *Epispadias* is characterized by a lack of union of the upper wall of the urethra. It is generally combined with a similar defect in the anterior wall of the bladder (extroversion). Epispadias, like hypospadias, has been cured by plastic operation, such as stitching together flaps derived from the mucous membrane of the vestibule, or by uniting two lateral denuded surfaces in front of the open urethra.

4. The *clitoris* is sometimes split in two lateral halves, with or without cleavage of the urethra. It may be absent, or very small, or, on the other hand, as large as a medium sized penis.

5. The *prepuce* is frequently adherent to the glans, and in many cases this condition gives rise to reflex neuroses and even epilepsy and nymphomania.

6. The *labia minora* may be *absent*, or it may be *multiple*, each being split lengthwise in two or three flaps.

7. The *labia majora* may likewise be split by longitudinal clefts, or may extend so far back as to reach behind the anus so that there is no apparent perineum.

8. *Hemaphrodism*. By this term is meant a congenital malformation of the sexual organs, in which the germinal gland of each sex (testicle in the male and ovary in the female) is found in one and the same individual, together with more or less perfect organs belonging to both sexes. Anatomically and clinically it may be divided into two chief varieties, the *true* and the *spurious*, or *pseudo-hemaphrodism*. *True hemaphrodism* may be divided into three forms: *bilateral*, in which an ovary and a testicle are found on each side; *unilateral*, in which an ovary or a testicle is found on one side, and on the other both an ovary and a testicle; and *lateral*, in which an ovary is found on one side and a testicle on the other. *Pseudo-hemaphrodism* is that condition in which the sexual glands belong to one sex, either masculine or feminine, while the passages leading from them, as well as the external parts, approach more or less the other. There are two great varieties of this malformation. *Androgyne*, in which a man simulates a woman both in the general conformation and local appearance of his sexual organs; and *gyandria*, the far less frequent condition, in which a woman simulates a man, the resemblance being confined almost entirely to the external sexual organs. The clitoris is elongated two or three inches and possessed of more or less erectility, and perhaps the labia partially united so as to have the appearance of a scrotum.

The diagnosis of the sex is often difficult. A periodical bloody discharge has even been observed to take place from apparently normal male genitals, especially from males suffering from hypospadias.

The *treatment* is practically *nil*. A hypospadiac urethra may be restored, a blind vaginal pouch closed, but usually nothing can be done to restore the parts to their normal state. A hypertrophied clitoris should, of course, be removed.

Hernia. Two kinds of hernia find their way into the labia majora, the *anterior* or *inguino-labial* and the *posterior* or *vagino-labial*.

The *inguino-labial*, or that kind corresponding to an inguinal hernia in the male, is not uncommon. The hernia comes out through the inguinal canal, follows the round ligament, and descends into the anterior part of the labium majus. It may contain intestine, a portion of the mesentery or omentum, an ovary, the bladder, or even the entire uterus. It may be mistaken for a tumor of the round ligament or a hydrocele, or for an abscess, cyst, or tumor in the labium, but by paying attention to the general rules laid down in the surgery of hernia a diagnosis may be readily made.

Treatment. A properly fitting truss will very often give the required relief, but the wearing of it is occasionally uncomfortable or irksome to the patient. This class of hernia is particularly suitable for what is commonly known as the *radical operation*, and Bassini's method, modified so as to apply to the female inguinal canal, is very readily performed and gives excellent results. In cases where the opening is large or direct, buried silkworm sutures, uniting the conjoined tendon with the deep part of Poupart's ligament, will give the necessary and permanent support, acting in the same manner as silk worm sutures when buried in the aponeurosis, after cœliotomy, to prevent ventral hernia.

Vagino-labial is a much rarer form of hernia. The escaping abdominal viscera descend in front of the uterus, along the vagina and bladder, between them and the levator ani muscle, and form a swelling at the posterior

end of the labium majus. It usually contains a part of the small intestine.

Treatment. It is difficult to hold this form of hernia back, but, as it may become very large, the attempt should be made with vaginal pessaries or inflatable rubber bags.

Hydrocele consists in a collection of fluid in that part of the round ligament which lies in or below the inguinal canal. This fluid may be contained in the process of peritoneum which at times surrounds the ligament outside the internal inguinal ring (canal of Nuck), and in this way may communicate with the abdominal cavity; it may be in the surrounding connective tissue, or in the ligament itself. Great care should be observed in making a diagnosis of this rare malady. The sense of fluctuation, with entire absence of symptoms of inflammation, the absence of resonance on percussion or other signs of hernia, the existence of translucency, and the gradual development of the tumor without pain or constitutional excitement, would be reasons for suspecting it.

Treatment. It is unsafe to inject these tumors, the same as in the male, on account of the uncertainty of the diagnosis. By open incision the diagnosis may be properly made and appropriate treatment pursued. The incision is made over the tumor in its long axis, the sac opened and the contents carefully examined. After the fluid has been evacuated the wall may be touched over with strong carbolic acid, the cavity packed with iodoform gauze and allowed to heal by granulation. Should the sac communicate with the general peritoneal cavity, it should be drawn down and closed off by a circular catgut ligature, or by one of the methods recommended for the radical cure of hernia.

Hæmatocele of the canal of Nuck and hæmatoma of the round ligament are even more rare than hydrocele. The former consists of a collection of blood within the process of peritoneum, and the latter in the interior of the

round ligament, as they lie in the inguinal canal. They may be diagnosed from intestinal hernia by the points referred to when speaking of hydrocele, and from hernia of the ovary by its immobility and absence of sensitive-ness. The treatment consists in making an incision into it, turning out the contents and packing with iodoform gauze.

Injuries. The vulva may be the seat of bruises or wounds in consequence of a fall upon some blunt or sharp instrument, or from blows or kicks, which, if slight, readily respond to ordinary treatment. Should the injury be so localized or of such violence as to injure the reticulated plexus of large veins, known as the bulbs of the vestibule, one of two effects will be produced. If there be corresponding rupture of the skin a free and sometimes alarming hemorrhage will occur, known as *pudendal hemorrhage*. If the skin remains intact, the blood pouring out into the areolar tissue surrounding the wounded plexus will soon form a coagulum, constituting a bloody tumor which has received the name of *pudendal hæmatocele*.

Causes. The *predisposing causes* are pregnancy, varicose condition of the veins, and large pelvic tumors; the *exciting causes* are muscular efforts, blows, or incised or punctured wounds. In pudendal hemorrhage a physical examination will at once reveal the condition, and the control of the flow will not be difficult if managed on the general principles laid down for the treatment of hemorrhage. The clotted blood which forms a pudendal hæmatocele may occupy the tissue of one labium or the areolar tissue immediately surrounding the wall of the vagina. When a considerable sized vessel has been ruptured the tumor may reach the size of an orange; at other times it is quite small, perhaps not larger than a walnut. Care must be observed not to confound it with abscess, pudendal hernia, inflammation of the vulvo-vaginal glands, or œdema. The physical characteristics,

mode of development, and rational signs of such affections are so different from pudendal hæmatocele that a careful examination will always settle the point with certainty.

Natural course after formation. Should the tumor be left to itself, it may be absorbed in a short time; in five or six days it may burst and discharge; the clot may become encysted and remain indefinitely; or it may create suppurative inflammation and formation of an abscess.

Treatment. A small tumor may be let alone, or treated with a cooling astringent or absorbent application. When the tumor is large, or experiment has demonstrated that it will not undergo absorption, it is advisable to make an incision into it and evacuate the contents. If bleeding points appear they may be secured by forcipressure, and the cavity afterwards packed with iodoform gauze. When the cavity is large, or the hemorrhage abundant, buried catgut sutures may be inserted through the walls of the tumor so as to include the veins from which the hemorrhage occurs. After approximation of the walls by these ligatures, and a gauze drain introduced, superficial sutures may be inserted in the marginal mucous membrane. As soon as pus is formed, whether large or small, it must at once be evacuated, the cavity carefully washed out with bichloride solution and drained with strips of iodoform gauze.

Phlegmonous inflammation. The areolar tissue of the labia majora is frequently the seat of inflammation and abscess. The disease is excited by irritating vaginal secretions, vulvitis, direct injury, and the peculiar blood state which results in the development of furuncles and carbuncles.

Diagnosis. It is usually easy to distinguish this disease, but care must be taken to diagnose it from hernia of the intestine or ovary, and from hæmatocele, œdema, and vulvitis. The ordinary symptoms of inflammation

and the exquisite sensitiveness of the swelling will serve as a valuable aid.

Treatment. The first stage is best managed by cold sedative and astringent applications, such as acetate of lead and opium lotion. If suppuration is inevitable it should be met by hot fomentations and hot bichloride absorbent cotton poultices. Early evacuation of the pus as possible is advisable, because the tissues obstinately resist natural evacuation, and the accumulation of pus is likely to point in another direction.

Cysts and abscesses of the vulvo-vaginal glands. The long excretory ducts of these glands, situated on each side of the ostium vaginae between the vagina and the ascending branch of the ischium, sometimes become occluded by adhesive inflammation arising from acrid discharges, from the presence of pruritis from other irritating causes. As a result, the secretion of these glands is retained; they undergo great enlargement and distension with or without preliminary formation of a cyst; suppurative inflammation may be set up and abscess result.

Diagnosis. When cystic distension exists, the locality of the round or ovoid mass rolling slightly under the finger, without tenderness, will assist in making a diagnosis. Pudental hernia and hydrocele of the round ligament are two important conditions from which they must be diagnosed. Hernia is reduceable and gives a distinct impulse when the patient is requested to cough, and it does not feel so elastic as in the case of cysts. Cysts grow slowly, the percussion sound is dull, whereas the appearance of a hernia is rather sudden and, if an enterocele, is resonant on percussion. When inflammation has been set up there are the usual symptoms present, the mouth of the duct is red, and the finger pressed over the site of the gland will discover a hard, painful, and perhaps fluctuating tumor, about the size of a small hen's egg. It

may be known from phlegmonous inflammation of the labium by its distinct globular and limited outline, the former affection being diffuse.

Treatment. The cyst may be incised within the free edge of the labium and, after evacuation of the contents, the sac wiped out with tincture of iodine or a ten per cent. solution of chloride of zinc, and then packed with iodoform gauze. It is desirable to remove a portion of the sac wall after having incised the cyst. This operation, although tedious, is certain in its results, and is the best to follow under ordinary circumstances. The total removal of the cyst is often a difficult and sometimes bloody operation, and had better not be attempted, unless prepared for such emergencies. Pozzi recommends, after withdrawing the contents, to distend the sac with warm parafine, and when hardened, to dissect the whole mass out. After the removal of the sac, by whatever method employed, the cavity is closed by a deep row of sutures placed through the edges of the wound and passing down through the bottom of the cavity, and a second row placed at half the depth. After insertion they are to be tied in the order in which they were placed. When inflammation sets in, it is to be treated in the same way as for abscess of the labia, and as soon as fluctuation is distinct the pus should be evacuated by a long incision, the cavity irrigated with bichloride solution and drained with iodoform gauze.

Tumors. The vulva is subject to the formation of a variety of tumors. The *condylomata acuminata* or *papillomata* may be due to gonorrhœal irritation, or simply to the hyperæmia and discharge from the parts occurring during a vulvo-vaginitis or normal pregnancy. They are found chiefly on the labia minora, or at the posterior commissure, and may extend more or less deeply into the vagina.

The *condylomata lata*, occurring on the inside of the labia majora, on the perineum, or around the anus, are

always due to syphilitic infection. The treatment of the acuminate and papillomatous varieties consists in cutting them off with curved scissors, and touching their bases with caustic or with the actual cautery; or they may be effectually removed by puncture with the negative electrolytic needle. Compresses soaked in the tincture of *thuga occidentalis* mixed with equal parts of water will, in some cases, cause atrophy of these growths.

Lipoma have their origin either in the labium majus or in the mons veneris. They are rare, but when they occur, sometimes attain large dimensions.

Myoma, fibroma, myxoma, and *mixed growths* have their origin ordinarily in the labium majus. Their tendency is to grow in the direction of the least resistance, and hence it is not unusual for them to become pedunculated, and sometimes they reach as low as the knees. The treatment of these tumors is surgical and, when operated upon with care, is devoid of danger.

Elephantiasis vulvæ. This disease, seldom seen in this country, may affect the entire vulva or only part of it. Its location is generally on the labia majora, the clitoris, and the nymphæ. Histologically, several varieties of this disease occur, but they have all one element in common, namely, a change in the lymphatic circulation, the lymph vessels being dilated and indurated from the beginning. They have their origin from repeated attacks of lymphangitis, which ultimately result in hyperplasia of the entire derma and subcutaneous connective tissue. When inflammatory changes with new formations occur first in the papillæ, the tumor strongly resembles the large coalescing condylomata. The large tumors are liable to extensive ulceration from local irritation, and the warty forms may undergo malignant degeneration.

Treatment. All medicinal treatment has thus far failed; the same may be said of the galvanic current, the only rational one being surgical.

Lupus, sarcoma and *cancer* are fortunately rare. They occur usually upon the labia minora or majora and spread thence in various directions. The prognosis of cancer, which is usually of the epitheliomatous variety, is unfavorable, unless seen very early and completely extirpated. Sarcoma presents itself as a tumor springing from either the labia majora, the labia minora, or the clitoris, and is diagnosed mainly by its rapid growth and soft feel. In cases of difficult diagnosis, resort should always be made to the microscope.

Neuromata are of more frequent occurrence, and are either situated about the meatus or clitoris, or at the posterior commissure. They are usually nodules, not larger than a pea or bean, and exquisitely sensitive to the touch. They should be removed by thorough deep incision with scalpel or scissors.

Varicose tumors. Such tumors may occur in the vulva as the result of pressure from a pathological or physiological growth in the pelvis. The distended veins are readily recognized, and can hardly be mistaken for any other condition. In most cases they are connected with pregnancy, but may occur independently of it. They may burst spontaneously and if the skin holds, a hæmatoma is formed. If the skin breaks, a serious if not fatal hemorrhage may follow, especially when associated with pregnancy, at which time they are often of large size.

Urethral caruncle. Just at the edge of the meatus urinarius, and sometimes along its wall for some distance, little vascular tumors develop which render the canal very irritable. They consist of hypertrophied papillæ, are extremely vascular, and are richly supplied with nerve filaments, facts which account for two corresponding clinical observations, namely, that they bleed very freely and readily, and that they are almost as sensitive to the touch as a neuroma.

Symptoms. The patient complains of pain, accompanied often with hemorrhage during sexual intercourse, in passing urine, in walking, or by contact of the clothing. Inspection shows at the meatus a florid vascular growth, varying in size from that of a cherry stone to that of a pigeon's egg. Sometimes, instead of one, quite a number may be found of small size extending around the meatus. Care must be taken not to confound it with prolapsus urethræ.

Treatment. In single large caruncles an almost positive promise of relief may be held out from its removal by means of the thermo-cautery. When a number of small fungous growths surround the meatus and extend up the urethra, cure is extremely difficult, as after their removal the morbid process rapidly produces more. When the urethra has been invaded it should be thoroughly stretched and the growths brought into view, when they may be removed by scissors, or scraped from their attachments by a curette, after which their bases should be touched by the thermo-cautery. Special attention should be paid to any disordered condition of the urine or disease of the bladder. The nervous hyperæsthesia engendered during the growth of these tumors is apt to continue, and an irritable condition of the urethra and neck of the bladder are likely to follow for some time after their removal, hence it is well to notify the patient of these probabilities.

Urethral venous angioma is a disease affecting the urethro-vaginal tubercle, and occasionally the urethro-vaginal wall. It sometimes attains a large size and projects between the labia. Absence of sensitiveness will diagnose it from urethral caruncle, which it closely resembles in appearance, but the treatment is identical with that condition.

Prolapsus urethræ. This accident consists, when acute, of prolapse of the urethral mucous membrane alone, but if it is of long standing there will be in ad-

dition a proliferation of the underlying connective tissue. It is not an uncommon condition, and may exist for some time without symptoms, but usually it creates difficult and painful micturition, pruritis vulvæ and leucorrhœal discharge. It may be confounded with urethral caruncle and venous angioma, but can be recognised by remembering that it produces a projection which completely encircles the meatus, while the former do so only in part. Neither pain nor hemorrhage can be depended upon for diagnosis, as prolapse may develop such symptoms very decidedly.

Treatment. Acute cases may be treated by replacing the protruding mass, and by the subsequent application of hot water, by rest in bed and by efforts to prevent rectal and vesical tenesmus during the evacuation of these organs. Tannic acid, or other astringent bougies, may be introduced into the urethra. These means failing, recourse may be had to linear cauterization of the prolapsed membrane by means of the thermo-cautery. Excision of the redundant tissue is frequently necessary and, after removal with the knife or scissors, the urethral mucous membrane should be stitched to the margin of the orifice with fine sutures.

VULVITIS.

Vulvitis is the name applied to inflammation of the skin and mucous membrane covering the vulva. It appears in three different forms, *simple*, *purulent*, and *follicular*. To this classification there has been added by some, the *phlegmonous*, *venereal*, and *gangrenous* forms.

Simple vulvitis is by far the most common form of inflammation. It is usually produced by the irritation of acrid vaginal discharges, by the presence of pediculi, or by pruritis. The secretions from the inflamed surfaces are usually of a serous, non-purulent character. The *diagnosis* is made by the red eroded appearance of the

vulva, which often extends down to the anus and to both nates, especially in stout women.

Purulent vulvitis. This variety of the affection may be either a non-specific form or a true gonorrhœa. It may result from simple vulvitis, specific or simple vaginitis, uncleanliness, friction from exercise, eruptive disorders, onanism, chemical irritants, or excessive venery.

Diagnosis. The parts are red, swollen, hot, and at first dry, but soon a free flow of pus takes place which bathes the whole surface. In addition to these signs of active inflammation, superficial ulcers will be found scattered over the parts affected, and at times the inflammation will extend to the submucous and subcutaneous connective tissue, producing abscesses (*phlegmonous vulvitis*), and in rare cases patches of membrane will be seen adhering to them (*diphtheritic vulvitis*). The glands of Bartholin may be involved, leading to suppuration and the formation of abscess. At times the meatus urinarius becomes affected, producing a reddish margin around it, accompanied by painful micturition, and a sensation of heat and scalding. The pus which is discharged, especially when specific, gives forth a disagreeable odor, and is exceedingly irritating when brought into contact with other parts.

Follicular vulvitis. By this form of vulvitis is meant inflammation of the muciparous, sebaceous, and piliferous glands. In ordinary purulent vulvitis these, as component parts of the diseased membrane, are implicated in the morbid action, but sometimes the glands alone are affected by disease, when the name follicular vulvitis or vulvar folliculitis has been applied. The causes are about the same as those of purulent vulvitis, and the general symptoms those of local inflammation, but it is diagnosed by the peculiar appearance it gives to the vulva, the labia majora and minora being studded with small round red protuberances, from the size of a millet seed to that of a

hemp seed. Often a hair comes out from the middle of one of these elevations, and from the opening a drop of pus may be pressed out. As a rule the inflamed follicle bursts, and shrivels up, but exceptionally the disease ends in induration and the production of small hard nodules.

Diagnosis. The signs and symptoms are usually clear enough, nevertheless it is sometimes difficult to distinguish one variety from the other. It is especially important, but often impossible, to determine whether the inflammation present be of a gonorrhœal nature or not. The history of the case is generally wanting or misleading, but the following features may be looked upon as important, not only in making a diagnosis of gonorrhœal vulvitis, but of gonorrhœal infection in organs beyond: A purulent discharge in the absence of ulceration, erosion, or malignant disease, associated with inflammation of the urethral orifice, and two bright red spots marking the orifice of the ducts of Bartholin's glands (*macula gonorrhœica*); warty condylomata complicated with follicular vaginitis; salpingo-perimetritis; sudden development of inflammatory disease of the genital organs in a newly married woman, which injures her health to a degree out of all proportion to the local condition; habitual abortion; sterility acquired after the birth of one child; ophthalmia neonatorum; and especially the detection of the gonococcus.

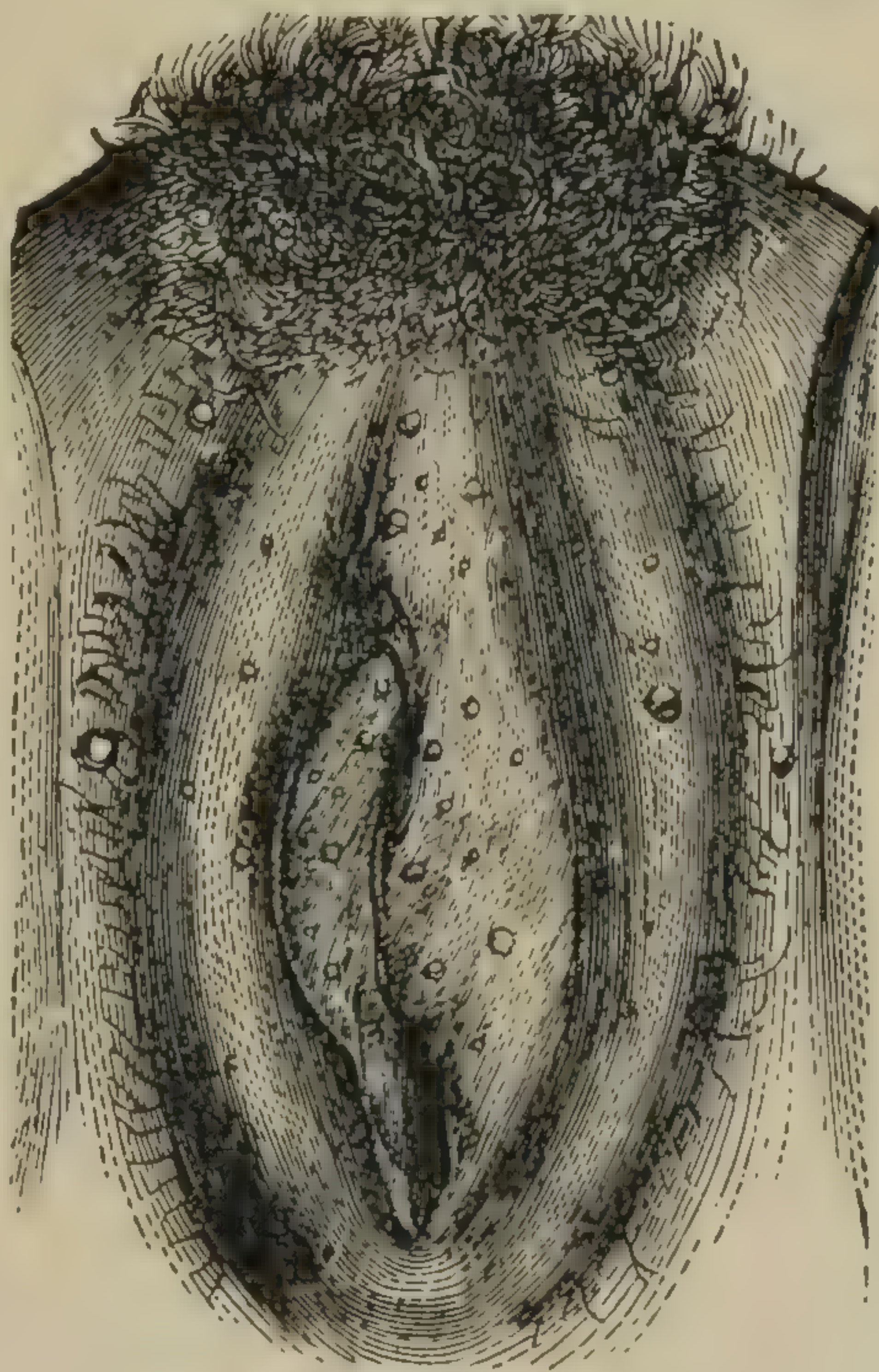


FIG. 40.—Follicular Vulvitis.

Treatment. Prophylaxis consists in scrupulous cleanliness and in the prevention and removal of every cause likely to produce it. In schools and institutions, it is of great importance that each person should have her own basin and towel. Sponges, as far as possible, are to be avoided; certainly they should not be used in common. In acute vulvitis the patient should be confined to bed and the diet of a light unstimulating character. She should sit for fifteen minutes in a warm hip bath, to which has been added bicarbonate of soda or permanganate of potash, and after this a compress wet with liquor plumbi subacetatis dilute, or a solution of boric acid (2 per cent), or of salicylic acid (1 to 6000), applied frequently. In the more chronic form, astringent and antiseptic applications will also be required, such as solutions of acetate of lead and opium, tannin, carbolic acid (1 to 60), sulphate of copper (1 per cent), corrosive sublimate (1 to 3000).

In chronic cases, particularly in the intertrigo of fat women, dusting powders will be found useful:

R. Boric acid, zinc oxid., aa. drams ii ;
 Pulv. amyli, drams iv ;
 Pulv. rad. iridis florentinæ, oz. i. M.

Ointments are indispensable in some cases, especially when the surface has to be protected:

R. Zinc oxid., drams ii ;
 Carbolic acid, dram ss ;
 Vaseline alb., oz. ii. M.

If there be much local irritation, thymol (2 per cent), or cocaine (5 per cent), may be added.

In follicular vulvitis the pustules should be opened and the parts fomented with an antiseptic compress. In acute inflammation of Bartholin's glands, a warm sublimate compress should be constantly applied and, as soon as the abscess shows any tendency to point, it should be freely opened, well washed out and drained with iodoform gauze.

There is a variety of vulvitis which has been styled *gangrenous*. It begins on the vulva as a white blister which soon changes to an ulcer; it next assumes a diphtheritic aspect and becomes gangrenous. It is a disease, however, almost entirely confined to children.

Eruptive diseases. The skin and mucous membrane making up the vulva may, like the same structures in other parts, be affected by eruptive disorders of various kinds. The following will include those most commonly met with:

Prurigo presents large scattered papules, very irritating, and generally have their apices bereft of cuticle.

Lichen shows more numerous papules resting upon a thickened and somewhat indurated cutaneous base. For such conditions the use of one of the following formulæ often proves very serviceable:

R.	Menthol, drams ii ;	
	Ol. Olivæ, drams iv ;	
	Chloroform, dram i ;	
	Lanolini, oz. ii.	M.
	Ft. unguentum.	

R.	Acid Salicyl, dram ss ;	
	Creosote, gtt. xl ;	
	Glycerini Amyli, oz. iii ;	
	Lanolini, oz. i.	M.
	Ft. unguentum.	

Eczema produces a red heated surface, covered with little vesicles which, breaking down, give forth a serous fluid. Sometimes there are successive crops of vesicles, and in many cases of diabetes and vesico-vaginal fistula ; this affection constitutes an exceedingly annoying and even painful complication. In the acute stage, cold or warm compresses and subacetate of lead lotions are generally all that is needed. When the discharge is profuse and watery the surface should be powdered. In more chronic cases Hebra's unguentum diachylum, white precipitate ointment (grs. xx. to oz.), or the following, will often prove very serviceable:

R. Boric acid, dram i ;
 Plumb. acet., grs. x ;
 Bismuth. subnit, dram i ;
 Vaseline alb., oz. i. M.
 Ft. unguent.

The vulva may also be the seat of *acne*, *erythema*, and *erysipelas*, but as these diseases offer nothing peculiar in this region they are to be treated the same as in other parts.

Herpes proenitalis is a mild inflammatory affection, consisting, as it does in other parts, of vesicles, or a group of vesicles upon an inflamed base, their appearance being preceded by a burning and itching sensation. The vesicles soon rupture and form scabs or shallow ulcers, each the size of a single vesicle. Sometimes it is accompanied with much œdema of the vulva and may lead to enlargement of one or more of the inguinal glands. It may be confounded with a chancre in the erosive stage, but that has a deep, dull red, coppery color, and its floor is smooth and shiny, without the small granulations found in herpes. This disease is also apt to be confounded with eczema, but the latter has a tendency to spread at the edges, herpes appearing in successive crops. In the early stage a cooling sedative lotion will give much relief, and the following ointment may be applied:

R. Menthol, dram i ;
 Ol. Olivæ, drams iii ;
 Bismuth. subnit, drams ii ;
 Lanolini, oz. ii. M.
 Ft. unguent.

Pruritis Vulvæ. This affection consists in irritability of the nerves supplying the vulva which induces the most intense itching, and desire to scratch and rub the parts. At first the irritability and tendency to scratch are slight and give little annoyance, but the disorder is aggravated by the counter-irritation which it demands for its relief. The itching is so extreme that it irresistibly drives the patient to scratch herself, and by constant

repetition the skin becomes tender, its nerves sensitive, excoriations and inflammatory conditions follow, all of which contribute to the morbid condition. The misery produced in such cases cannot be exaggerated; the patient is tormented night and day, society becomes distasteful to her, and she gives way to despondency and depression. The itching is generally intermittent, in some cases occurring at night, and in others only at certain periods of the day. It is not always confined to the vulva, the irritation often extending up the vagina, to the anus, and down the thighs. The predisposing causes are, uterine, vaginal or urethral disease; pregnancy; habits of indolence, luxury or vice; uncleanliness; or over-exercise in one of sedentary habits. In nearly every instance of pruritis one of the following conditions will be found to exist as the apparent cause at least: Contact of irritating discharges, such as from acute and chronic endometritis and vaginitis, from the discharge of cancer, from incontinence of urine, or from diabetes; local inflammation, as vulvitis, urethritis, or vaginitis; local irritation, as eruptions of the vulva, animal parasites, onanism, vegetations on the vulva, or vascular urethral caruncles. However produced, very soon secondary influences arising from excoriations, ulcerations, increased discharges, the result of scratching, superadd themselves as auxiliary agents and keep up the disorder.

Treatment. The first effort must be made to discover the disease of which the pruritis is a symptom, and remove it by appropriate means. But this alone will not be sufficient, for, while eradication of the mischief is being attempted, palliative means must be vigorously adopted for the sake of present relief. Perfect cleanliness should be secured by means of three or four sitz baths daily and the vagina syringed with pure or medicated water. The irritated surfaces should be protected by unctuous substances or inert powders, such as bismuth or zinc oxide,

combined with lycopodium or starch. In case the discharge comes from the uterus, after a thorough vaginal douche, the upper end of the vagina should be tamponed with cotton moistened with a weak sugar of lead or boracic solution. If it is the result of a local inflammation it should be treated as elsewhere recommended for such conditions. Temporary relief can be obtained by covering the parts with a lotion composed of the following:

R. Plumb. acet., drams iss ;
 Acid Carbolic, dram i ;
 Tinct. Opii, oz. i ;
 Aquæ ad., oz. xvi. M.

R. Hydrag. bichlor., grs. xvi ;
 Tinct. Opii, oz. i ;
 Aquæ ad., oz. xvi. M.

Relief may also be obtained by a strong solution of bromide of potash, or by painting the parts several times a day with glycerine mixed with chloroform or acid hydrocyan. dil. (1 to 8), or with morphine (3 grs. to the oz.), or at longer intervals with a ten per cent aqueous solution of cocaine. Ointments often give marked relief, such as:

R. Chloral. Camphor, aa., dram i ;
 Vaseline alb., oz. ii. M.

R. Acid hydrocyan. dil., drams ii ;
 Plumbi acet., grs. xl ;
 Olei cacao, oz. ii. M.

R. Acid Tannic, dram ss ;
 Ext. Belladonnæ, grs. x ;
 Vaseline, oz. ii. M.

Hyperæsthesia of the vulva consists in an excessive sensibility of the nerves supplying the mucous membrane of some portion of the vulva. Sometimes it is confined to the vestibule, at others to one labium majus, at others to the meatus, while at other times they may all be simultaneously affected. It is not a true neuralgia, but an abnormal sensitiveness of the nerves. There is no inflammatory action and examination reveals nothing; the slightest friction, however, excites pain and nervousness and any degree of pressure is absolutely intolerable. The

disorder is comparatively rare and the treatment of it most unsatisfactory, even complete destruction of the mucous membrane of the sensitive area with caustics, or its removal with the knife, has failed to produce a permanent cure.

Kraurosis vulvæ is a disease characterized by a peculiar atrophic shrinking of the integuments of the external genitals and perineum, resulting in the obliteration of the normal folds. The tissues affected become dry, shrink, lose their normal elasticity and become so brittle that the most careful examination may cause deep fissure. The surface assumes a whitish, macerated, shining appearance. This disease does not yield to any remedy.

Coccygodynia. Under this name are united different and partially unknown pathological conditions, the common feature of which is intense pain at the coccyx, whence it may radiate into the perineum, hips, uterus, or bladder. Sometimes there are palpable diseases or deformities of the coccyx, such as caries, ankylosis, luxation, or abnormal length. At other times it is combined with disease of the uterus, ovaries, or rectum, while in a third class it is of a purely neuralgic nature. It is usually found in women who have borne children, but it occurs also in virgins. It often appears after tedious labor, accompanied by rupture and straining of the muscles and ligaments. It may be due to violence from without, as from kicks, falls, or other injuries, while sometimes it appears to be due to a reflex neurosis. Severe pain is felt on sitting, and it may be so great that the patient can sit only on one half of the nates, near the edge of the chair, and the pain is aggravated in sitting down or getting up. The condition is easily recognized by introducing the index finger into the rectum, while the thumb rests on the skin over the coccyx. The slightest movement causes severe pain and sometimes it may be possible to feel the diseased condition of the bone.

Treatment. Before any plan of treatment is adopted care must be taken to discover whether the disorder is secondary to uterine disease or anal fissure. If such should be the case, the primary disorders and not their results should receive attention. If the disease be primary, blistering, hypodermatic injections of morphia and the persistent use of the galvanic current will often effect a cure. While they are being employed, three grain iodoform rectal suppositories may be used, together with general treatment to improve the nervous system. Should these means do no good, resort must be had to one of the radical methods for cure. The first operation consists in making an incision down upon the coccyx, lifting the exposed extremity of this bone, and then with a pair of scissors severing the muscles. It has been recommended to perform the operation subcutaneously, with an ordinary tenotomy knife, but it is by no means so easy a matter as one would suppose, besides, open incision clears up any doubt there may be in the diagnosis and, if found necessary, leads to the performance of the second method, which consists of the complete severance of all attachments, and the removal of the whole coccyx, by a pair of bone forceps, or by disarticulation with the knife.

CHAPTER XV.

LESIONS OF THE PELVIC FLOOR.

The pelvic floor, also known by the somewhat indefinite name of perineum, comprises the tissues which together occupy the space between the bones of the pelvic outlet. It is composed of a pair of broad thin muscles (levatores ani), which are the chief support of the pelvic viscera, and an arrangement of fasciæ and muscles, the components of which act as accessories. Until very

recently the perineum was considered as a thick wedge-shaped body, designated as the "perineal body," which, acting as an inverted keystone of an arch, materially aided in the support of the uterus. It is now more accurately regarded as a moveable centre of attachment for the muscles and pelvic fasciæ which enter into the formation of the pelvic floor, as well as for the attachment of the lower portion of the rectum and vagina. By a study of its anatomy and the result produced by the more or less complete laceration of it, its functions can be more readily estimated. Briefly, it may be said to assist in sustaining the anterior wall of the rectum, preventing a prolapse of this canal, which, should it occur, would have a tendency to drag down the upper vaginal concavity and destroy the equilibrium of the uterus. In the same way it assists in sustaining the posterior vaginal wall which otherwise would allow of a rectocele. The anterior vaginal wall, and with it the bladder, is in part supported by the posterior vaginal wall, and a sagging of this would tend to the production of a cystocele. It affords by its presence in the act of defecation counter-pressure, by which the fecal mass is turned backward to follow the curve of the canal, before it is ejected. The perineum may lose its tonicity or efficiency from the following causes:—

1. *Constitutional feebleness.* In girls of weak delicate fibre, the perineum will, without any assignable cause, be found incapable of performing its functions. Such cases are not commonly met with, but when they occur, the examining finger reveals not only abnormal relaxation of the perineum, but of the vaginal walls as well.

2. *Feebleness, the result of prolonged over distension.* When a prolapsed uterus remains for a long time between the labia, the perineum, by over distension, loses its power, and, after restoration of the uterus, remains permanently enfeebled. This condition is likewise produced

by the presence of large fibrous polypi, or by the wearing of large globular pessaries.

3. *Subinvolution.* During utero-gestation the perineum undergoes physiological hypertrophy, which continues until delivery. Involution may fail to take place, and it will thus remain large, lax, and wanting in contractile power. Subinvolution often affects the vagina and perineum simultaneously, and, as a result, the anterior vaginal wall and bladder sag downward for want of support, and the posterior vaginal wall and rectum protrude over the ineffectual perineal barrier.

4. *Senile atrophy.* Complete uterine prolapse is by no means rare in old women. As the decadence of advancing years shows itself, the perineum, hitherto strong, becomes inefficient and inactive.

5. *Laceration.* Injuries due to the passage of the child during labor are exceedingly common, and a large proportion of female diseases take their origin thus. Rupture of the perineum furnishes one of the most fruitful sources for the absorption of septic elements; and thousands of women suffer throughout their lives from uterine displacements, engorgements, and vesical and rectal prolapse, from injuries inflicted upon it during parturition.

Presented thus to the intelligent obstetrician who has familiarized himself with the anatomy and physiology of the perineum, it is difficult to understand how there can be any doubt of the propriety of early closure of a ruptured perineum, for should the operation prove a success, the gain to the patient will be great; if it prove a failure, no evil will have been done.

From what has been said it will be readily understood that certain diseases, disorders, or conditions are apt to be associated with, or to be the direct outcome of lesions of the pelvic floor. They may be thus enumerated:—

1. *Prolapse of the vagina.* When the tone of the wall of the vagina has been impaired and it pouches into its own canal, so as to fall downward toward the vulva, the condition is called *prolapsus*. From a study of the anatomical relations, it will be readily seen that prolapse of the vagina, without simultaneous displacement of one or more of its surrounding viscera, must be considered as exceedingly rare, and that it must of necessity be associated, to some extent, with rectocele, cystocele, or uterine prolapse. Among the causes of prolapse may be mentioned violent efforts of the abdominal muscles, repeated parturition, senile atrophy, rupture of the perineum, previous distension by tumors, and subinvolution of the vagina and perineum. The displacements may be of two forms, acute, or that form which comes on as a result of violent effort, which, with great suddenness, forces the contents of the abdomen down upon the pelvic viscera, and is generally accompanied by sudden descent of the uterus. The ordinary or chronic form is that which, by slow and steady action of one or more of the causes enumerated, little by little forces the folds of the vagina downward, toward or through the vulva.

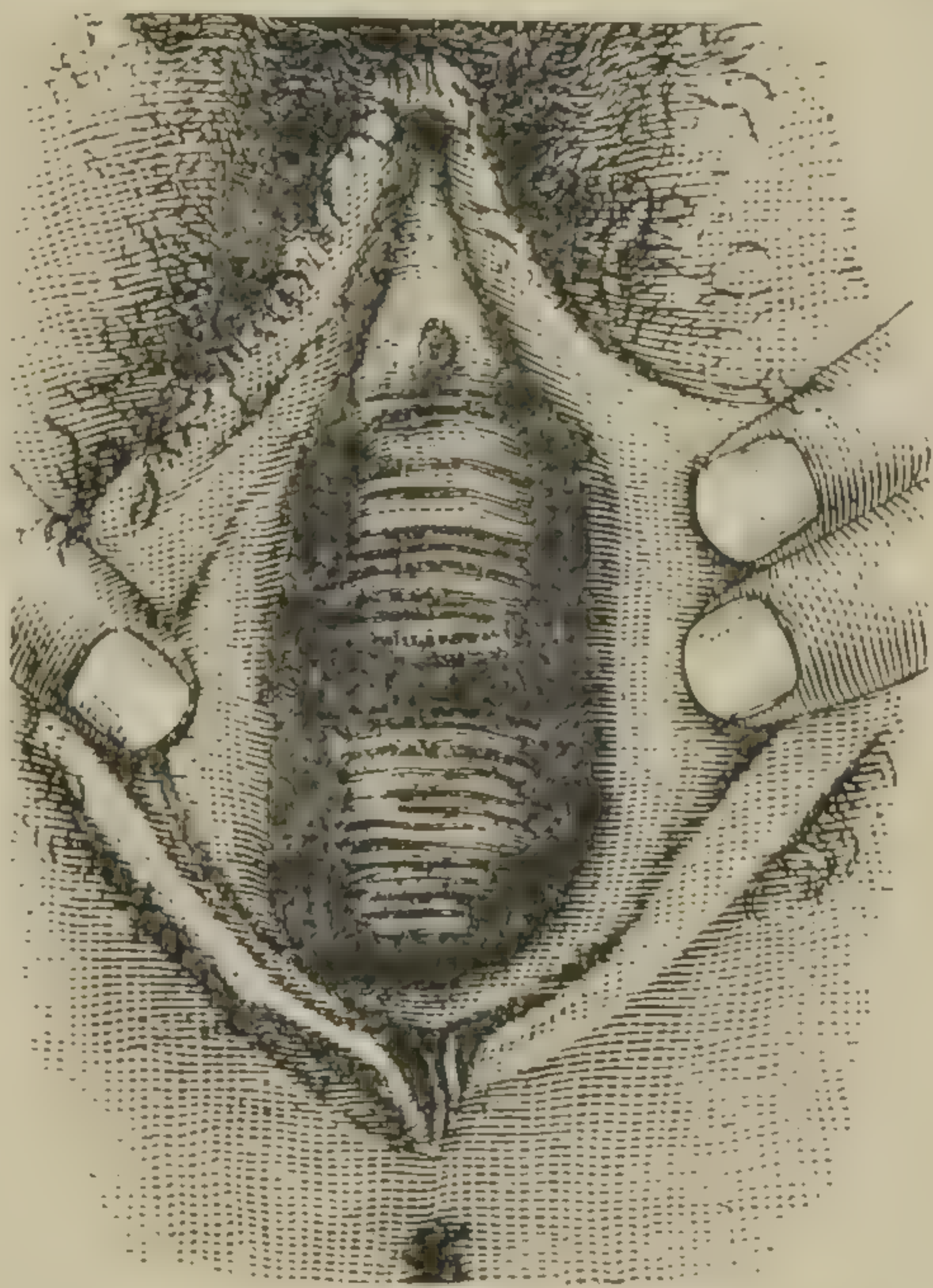


FIG. 41.—Cystocele and Rectocele.

2. *Cystocele*, or prolapse of the bladder, consists of descent of the bladder toward the vulva, so as to impinge upon the vaginal wall. When the anterior wall of the vagina ceases to afford the required support, the bladder

descends and forms a small pouch in the vagina, which gradually increases until it forms a decided tumor and protrudes between the labia. Residual urine retained in this species of diverticulum decomposes, cystitis and vesical catarrh are established, all of which further annoy the patient by the new set of symptoms produced.

3. *Rectocele*, or prolapse of the rectum, occurs in a similar manner, and the pouch thus formed soon becomes filled with fecal matter. The feces becoming hard, and in consequence irritating, create mucous inflammation and discharge, accompanied by tenesmus, obstinate constipation, and hemorrhoids.

4. *Enterocoele*, or prolapse of the intestine, consists in descent of a portion of the small intestine into the pelvis, so as to encroach upon the vaginal canal. Loops of intestine, finding their way to the bottom of Douglas' pouch, gradually stretch this serous prolongation and, advancing between the rectum and vagina, push the posterior wall of the latter before it so as to form a tumor at the vulva.

Treatment. Should the accident have occurred suddenly, reduction should at once be accomplished, and the recurrence of displacement prevented by appropriate means. Sudden cases of vaginal prolapse, cystocele or rectocele are, however, very rarely met with, and it is mostly those which have slowly and gradually established themselves that demand treatment.

The methods adopted for overcoming such cases are:—

1. By the use of *local astringents* and by the persistent insertion of medicated astringent *tampons*. These methods will often restore the tone of the vaginal walls and bring about a complete cure, but they can only be effectual in slight cases; in those of graver character they will prove insufficient.

2. By *supplementary supports*. Numberless forms of special supports have been invented for the purpose of

affording relief, with more or less success. The vaginal pessary does little or no good here. In many cases no pessary which rests upon the walls of the vagina can be retained within the distended canal; in others none can be found capable of resisting the downward pressure; while in all, increase of dilatation and atony is affected by them. In some cases an exception will be found to this rule in Cutter's cup pessary, or some similar instrument, supported by an external attachment. Gehrung's pessary, while it does not cure cystocele, gives much comfort to the patient, and may obviate the necessity for operation, when such is considered inadvisable.

3. By *surgical procedures*. Of these there are three, any one of which may prove effectual. If a ruptured perineum seems to produce the want of support, perineorrhaphy may be all that will be necessary. Should this not be sufficient, colporrhaphy should be performed on the anterior or posterior vaginal wall, as one or the other seems most at fault, and should the condition be still further aggravated, an anterior colporrhaphy and posterior colpo-perineorrhaphy may be resorted to, to retain the prolapsed structures.

Colporrhaphy or elytrorrhaphy is an operation resorted to with the idea of constricting the vagina so as to diminish its calibre and, by this means, remove the traction exerted by its fall upon the rectum, bladder and uterus.

Anterior colporrhaphy. Sims' method. The patient is placed in the dorsal position, and the knees separated by a Clover's crutch. A vulsellum is inserted into the anterior lip of the cervix; a tenaculum hooked into the mucous membrane of the anterior wall of the vagina, just below the urethra, and a Sims' large speculum introduced. Two tenacula are next hooked in near the lateral sulci, and the amount of tissue to be removed is estimated by approximating them. By making a snip

with a pair of scissors on each side, the greatest width of the surface to be denuded may be thus marked out. The whole surface to be pared is put on the stretch and, with a pair of scissors curved on the flat, a strip of mucous membrane, about one-third of an inch wide, is raised in the form of the letter "V," the apex being just below the urethra, the arms passing up on each side so as to include within them the amount of redundant tissue.

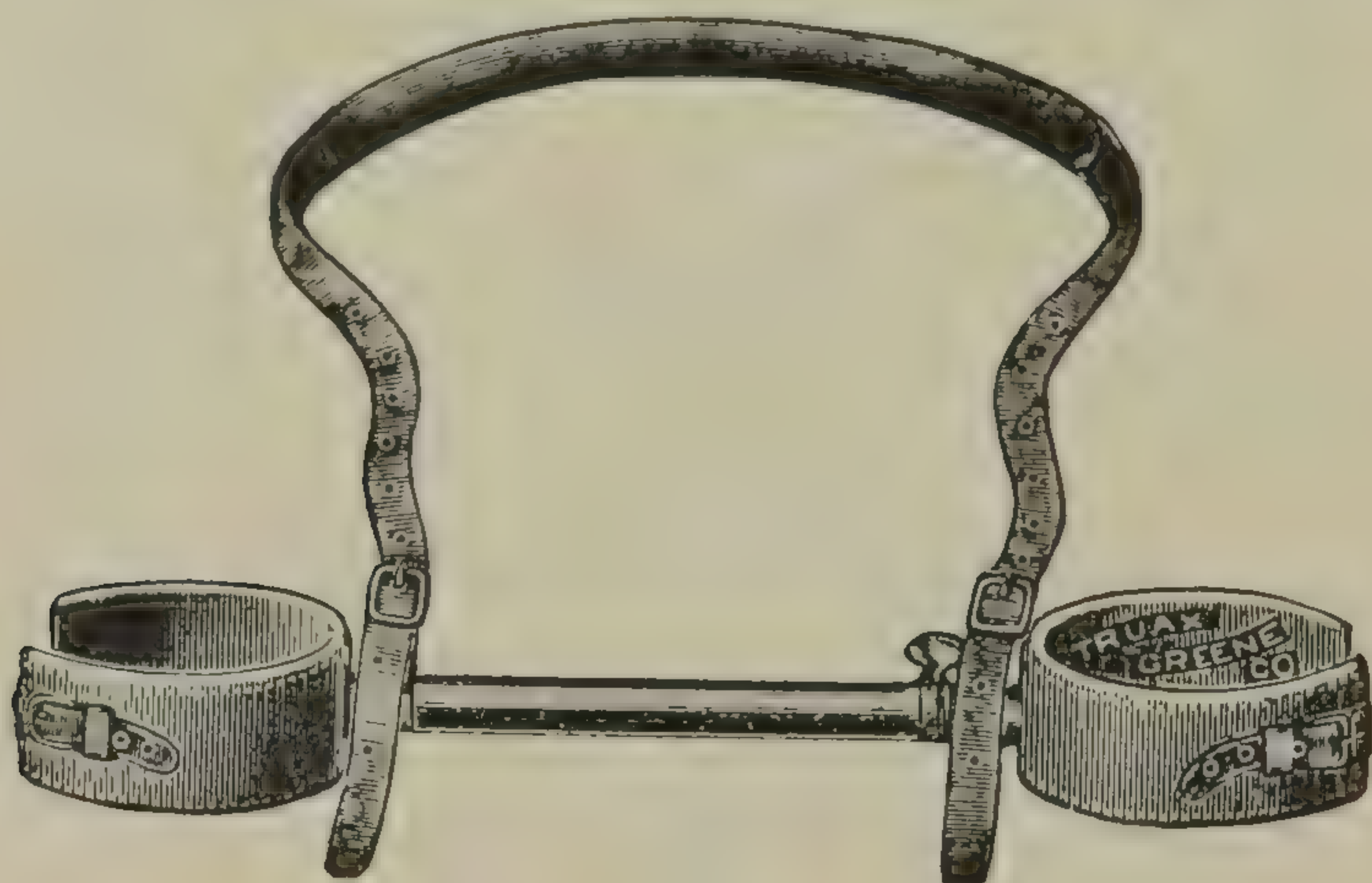


FIG. 42.—Clover's Crutch.

The two extremities of the arms pass back laterally as far as the cervix, and by a removal of additional strips of mucous membrane at right angles to the extremities of the arms, they are made to approximate each other in front of the cervix. Commencing at the apex of the triangle, catgut or silkworm sutures are passed beneath the denuded surface on one side, and then crossed over and passed beneath the denuded surface on the other side. After insertion the lateral denuded surfaces are approximated and the ligatures tied, care being taken in this, as well as in all similar operations, not to draw the sutures too tight lest they cut their way out.

Hegar makes his denuded surface in the form of a lozenge or rough ellipse, with the long diameter in the long axis of the vagina, and advises the excision of all the redundant anterior wall. Closure of the wound may be

carried out by through and through sutures of silkworm passed beneath the denuded surfaces, or by means of deep and superficial layers of interrupted sutures, or by two or more layers of superimposed continuous sutures.

Stoltz's method consists in making a circular denudation, embracing the larger portion of the prolapsed vaginal wall, and then passing a thick silk suture, with a needle at either end, just outside the edge of the wound, beginning at the point nearest the cervix and emerging on either side just below the meatus. The stitches are not entirely buried, but are made to emerge and enter again at short intervals, and when the denuded portion has been pushed up they are crossed and carefully tied.

Lefort's operation consists in denuding an elongated quadrangular surface on the anterior and posterior surfaces of the prolapsed vaginal walls, and then uniting them by sutures, replacing the uterus as the sutures are tied. It is obvious that this operation can only be selected for patients of advanced age, or for those who have ceased to menstruate.

Posterior colporrhaphy consists in the denudation of an elliptical surface on the posterior wall, similar to that described, but it is seldom resorted to alone. When indicated, it is generally combined with perineorrhaphy, forming the operation known as colpo-perineorrhaphy.

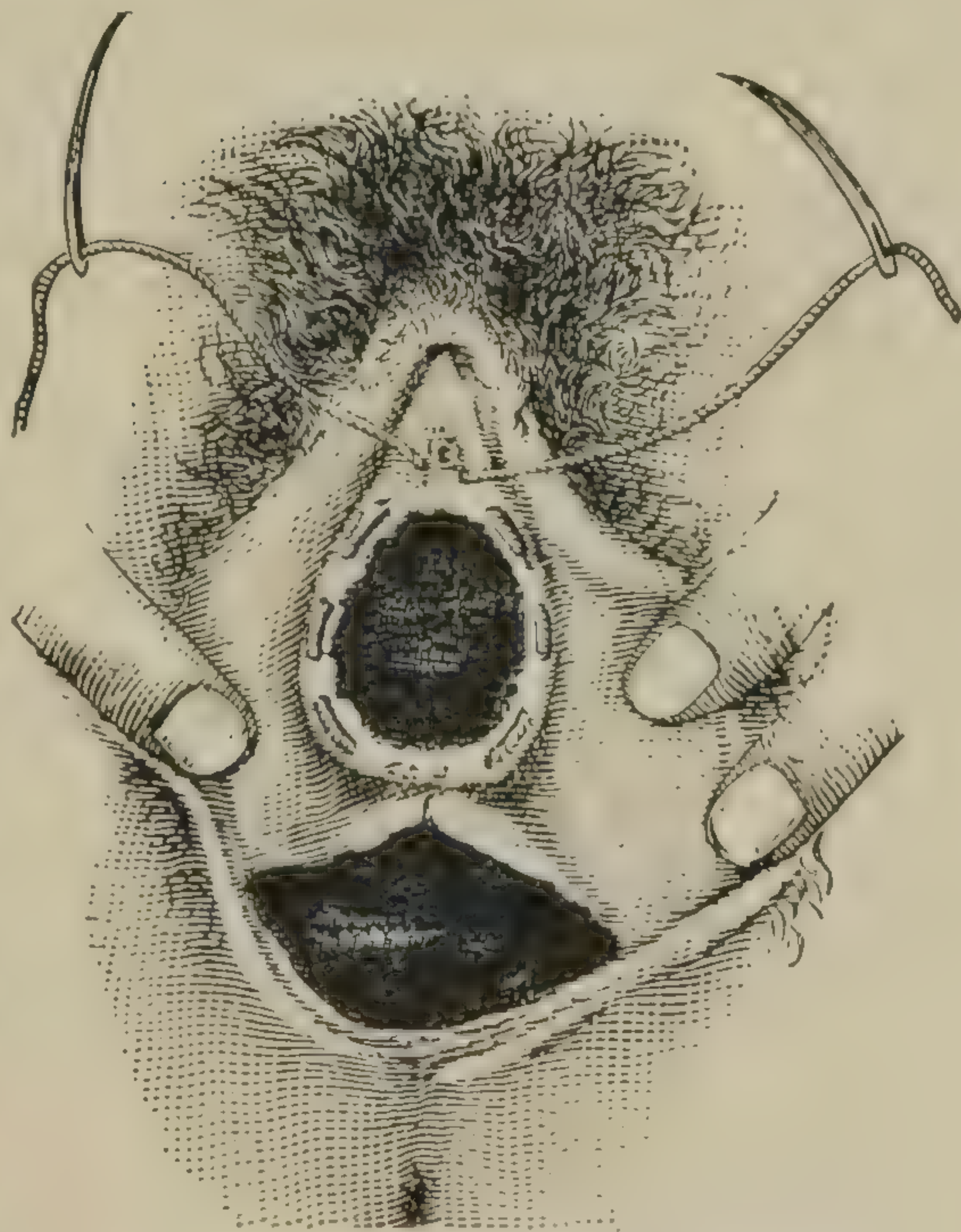


FIG. 43.—Stoltz's operation for cystocele and Hegar's operation for rectocele.

PERINEORRHAPHY.

By this term is meant restoration of the perineum. This operative procedure is not limited to the cure of laceration the result of parturition, but is appropriate to the restoration of a perineum which has lost its power and functions from any of the causes previously mentioned, and when performed for such is to be conducted upon exactly the same principles as those which apply to the operation for laceration.

Varieties of laceration. In its simplest form the laceration extends through the mucous membrane of the vagina, the integument, and the junction of the bulbo-cavernosus with the transversus perinei muscles, as well as through a few fibres of the levator ani and corresponding fasciæ. It may be more extensive, and prolonged backwards, so as to involve the structures as far as the sphincter. These forms have been designated as *incomplete* rupture. The rupture may extend through the sphincter ani, to which the name *complete rupture* has been given; or it may extend still farther and involve more or less the recto-vaginal septum. Instead of any of these, the laceration may be a subcutaneous separation of the muscles of the pelvic floor, at, or near their junction in the median line. The evils resulting from partial rupture are by no means insignificant, but they are more tolerable than those which follow complete rupture. When the sphincter ani is torn through, and still more markedly when the rectal wall is ruptured, incontinence of feces and rectal gases occur to such an extent as to embitter the life of the patient.

The consequences of rupture of the perineum may thus be presented: Subinvolution of the vagina, prolapsus vaginæ with cystocele or rectocele, prolapsus uteri, incontinence of feces and prolapsus recti. It is the opinion of many that a laceration which does sever the sphincter may unite without surgical treatment, but it is doubtful

if complete restoration ever occurs by immediate union. Repair is occasionally effected by granulation, and often is very efficient, but never perfect, on account of the tendency to formation of unnatural adhesions, cicatricial bands, and cicatricial tissues, with the consequent contractions, retractions, distortions and indurations.

Operation for incomplete rupture. The patient is placed on the operating table in the dorsal position, the legs being held apart by Clover's crutch. The first part of the operation consists in denuding the surfaces to be united, the extent to which this should be carried on depending upon the extent of injury, and the amount of prolapse of the vaginal wall. A point is marked on each side as high as the denudation should extend, the seat of the highest caruncula myrtiliformis often serving as a good guide. Grasping the tissue at one point with a pair of tissue forceps, scissors are made to remove a strip, at the junction of the skin and mucous membrane, from this point to a corresponding one on the opposite side. In a similar manner a strip higher up is removed, and so on until a sufficient surface has been

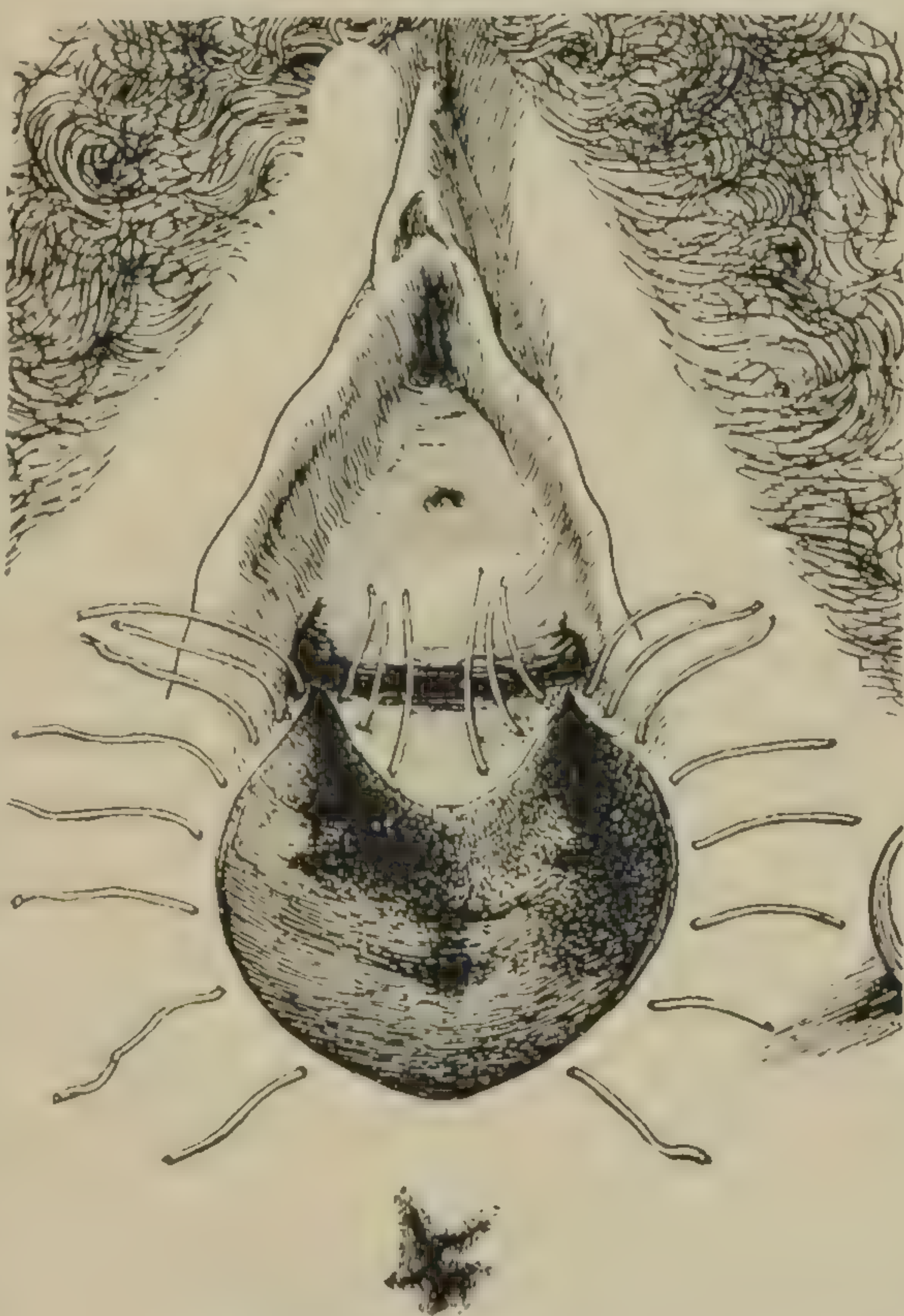


FIG. 44.—Operation for incomplete laceration of the perineum. Denudation completed, and sutures in the recto-vaginal septum introduced.

denuded. The distance to which this should be carried up will depend upon the extent and character of the injury. If there is no prolapse of the pelvic floor, or of the posterior vaginal wall, it will suffice to denude the surface as far as the original laceration only, otherwise it may be necessary to carry the denudation high up on the vaginal wall.

Hemorrhage can generally be controlled by sponges and hot water. If there is any decided spurting it may

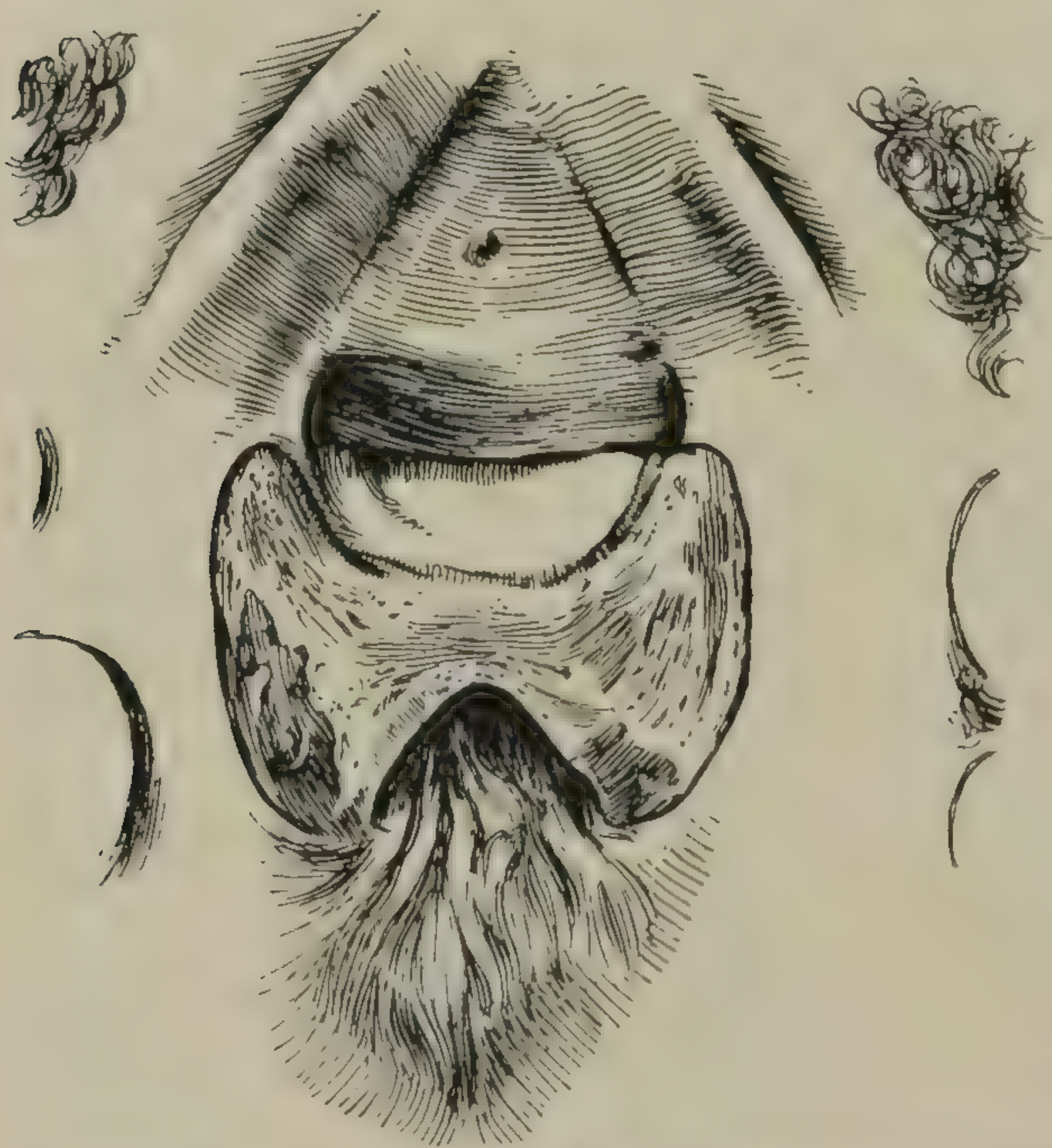


FIG. 45.—Operation for laceration of the perineum and sphincter ani. Denudation complete.

be checked by a light pinch with hemostatic forceps, or by the temporary introduction of a ligature until the sutures are introduced and tied, when all hemorrhage will then be brought under control. Commencing in the upper angles of the denuded surface which point toward, or lie in the lateral sulci, sutures are inserted on each side.

After these have been placed, a silkworm suture, threaded on a good sized, full-curved needle, is inserted through the skin, at the point where denudation was first started, and passed outward deep into the tissues. It is then curved round in the tissues in front of the rectum, then deep into the tissues on the other side, and made to emerge at a point corresponding to the one where it was entered. If there is any difficulty in making the needle follow this extensive curve, it may be brought out in the median line

and re-inserted. The next suture is inserted in the same way, about three-eighths of an inch nearer the anus, and so on with the third and fourth, until the posterior angle of the wound has been reached. The catgut sutures first introduced within the vagina are now tied and cut short. Next in order, the first silkworm suture is brought up, and, when tied, unites the highest points of the lateral edges of the denuded surface, and now forms the new posterior commissure. The remaining sutures are next tied in order, and the wound dressed with borated iodoform powder and with strips of iodoform gauze laid over the vaginal and perineal sutures, after which a pad and "T" bandage are applied. It will probably be necessary to catheterize the patient every six hours for a day or two, after that she usually can pass the urine voluntarily. On the second evening a mild laxative may be given and a soap and water enema the next morning, after which the bowels should be moved daily with an enema. The external sutures may be removed on the ninth day and the patient allowed up at the end of two weeks.

Operation for complete laceration. The two varieties, laceration of the sphincter ani alone, and that involving the recto-vaginal septum as well, may conveniently be considered together. If the bowel be not injured above an inch and a half from the sphincter, one operation will suffice, but if it extends far up, it is better to close it by a primary operation, consisting of vivifying its edges and uniting them. When the sphincter ani has been ruptured, the severed ends are drawn outward and backward by the retraction of the muscles, until they lie on either side nearly on a line with the posterior walls of the rectum, and are often easily recognised by a pitting or depression at these points. The process of denudation should be begun by seizing the end of the muscle on one side, and with scissors excise a strip of tissue, so as to free the torn

end of the muscle. From there it is to be carried forward and inward across the bridge formed by the recto-vaginal septum, cutting away all cicatricial tissue found in it, after which the denudation is to be continued down the opposite side, so as to expose the torn end of the sphincter there. After this, the denudation is carried upward upon

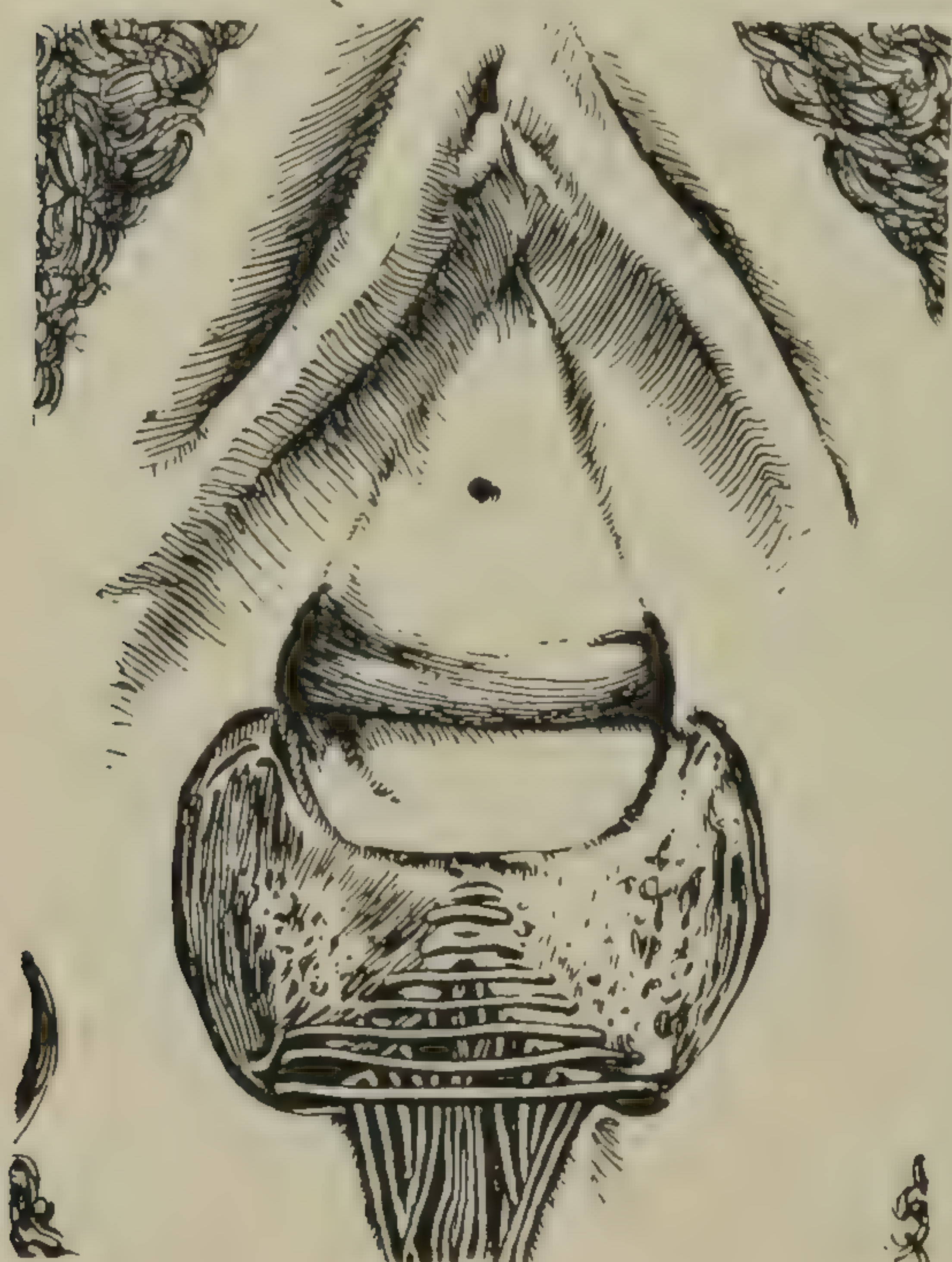


FIG. 46.—Complete laceration of perineum extending into recto-vaginal septum. Denudation complete, and recto-vaginal sutures inserted.

each side to the point where the laceration began, or even higher, if there is much relaxation of the rectal and vaginal walls. At this stage of the vivifying there are two broad denuded surfaces, one on each side, connected by an isthmus formed by the recto-vaginal septum. When the recto-vaginal wall has been involved for a short distance, catgut sutures are to be inserted from the rectal side; the highest one first, and, by means of them, carefully coaptate their denuded

surfaces. Care must in every case be taken to properly unite the denuded ends of the sphincter. For this purpose a silkworm suture or braided silk is to be inserted a quarter of an inch behind and inside the end of the retracted muscle, and carried under the denuded surfaces parallel to the repaired rent in the septum, so as to unite the innermost fibres. A second suture is inserted at the outer end of the broken sphincter and carried around parallel to the first, after which both are tied. A silkworm suture is next entered at the highest lateral point of the

denudation, where the new commissure is to be formed, and carried around after the manner described for incom-



FIG. 47.—Diagram of operation for simple rupture.



FIG. 48.—Operation for complete rupture.

plete laceration, after which the remainder of the operation is to be finished in the manner already described.

Flap-splitting operation. The operation referred to is that introduced by Lawson Tait, and recommended after him by Saenger. After the patient has been placed in the lithotomy position, the left index finger of the operator is introduced into the rectum, a blade of a pair of sharp-pointed scissors is inserted in the median line of the perineum, where the cicatricial tissue meets the skin, and is made to cut to the left in a curved line along this margin, to the upper border of the perineal cicatrix. The scissors are again inserted in the median line and made to cut to the right, so that when complete the incision assumes a “U” shape. The upper vaginal flap is then drawn upward, in front of the vestibule, by means of tissue forceps, and the lower rectal flap downward, by similar

means, increasing, if necessary, this new formed quadrilateral surface by splitting the septum farther up. A curved needle, pushed through the skin, outside the wound, at the anterior end of one incision, is made to pass under the cut surface, and is so directed that it will pass through, or just in front of the commissure formed by the two flaps and emerge through the skin on the other side at a point corresponding to the point of entrance. A similar suture is inserted half an inch farther back, and made to traverse the tissues of the rectal flap lower down.

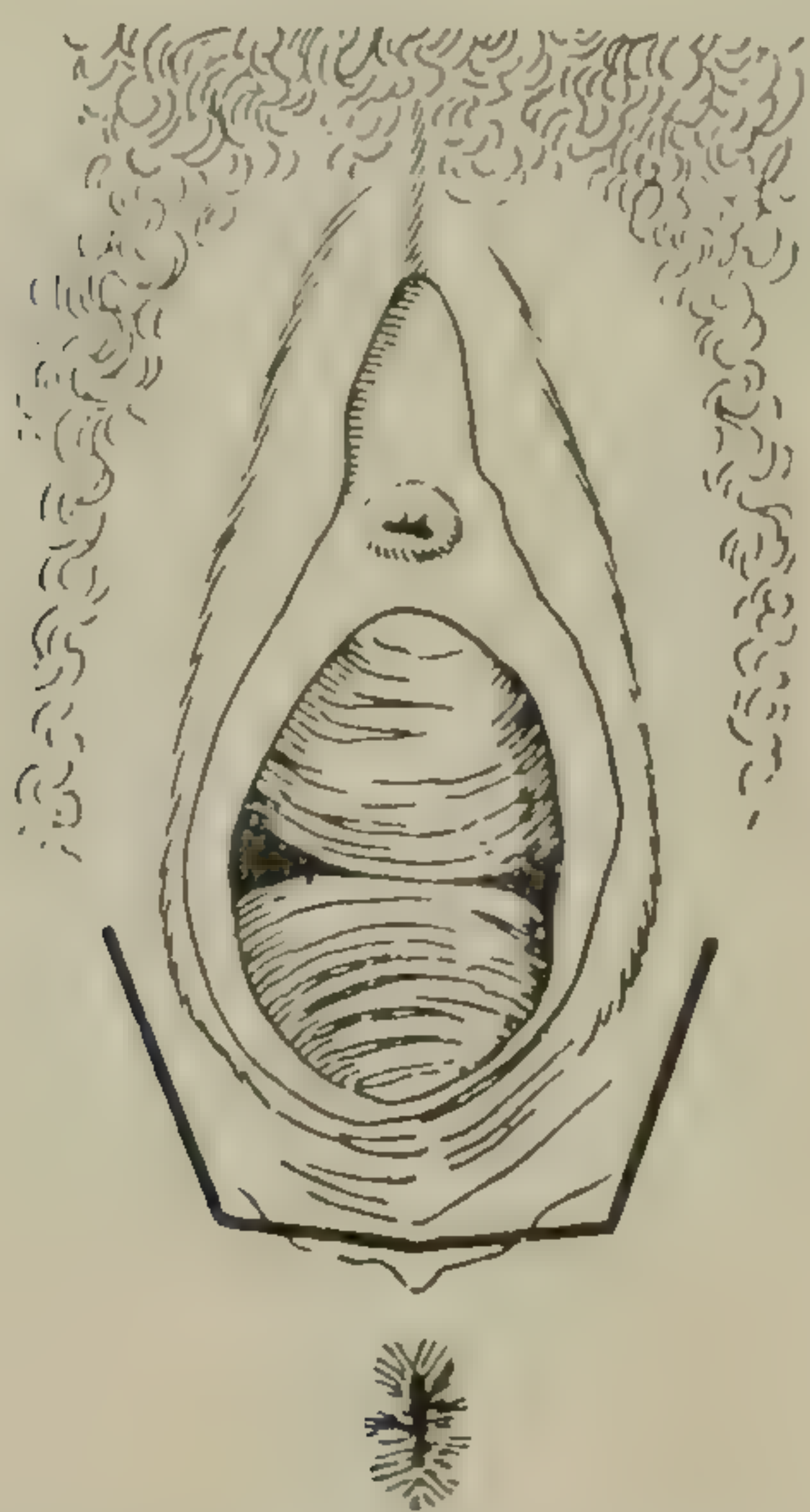


FIG. 49.—Flap-splitting operation for incomplete laceration of the perineum. Lines of incision.

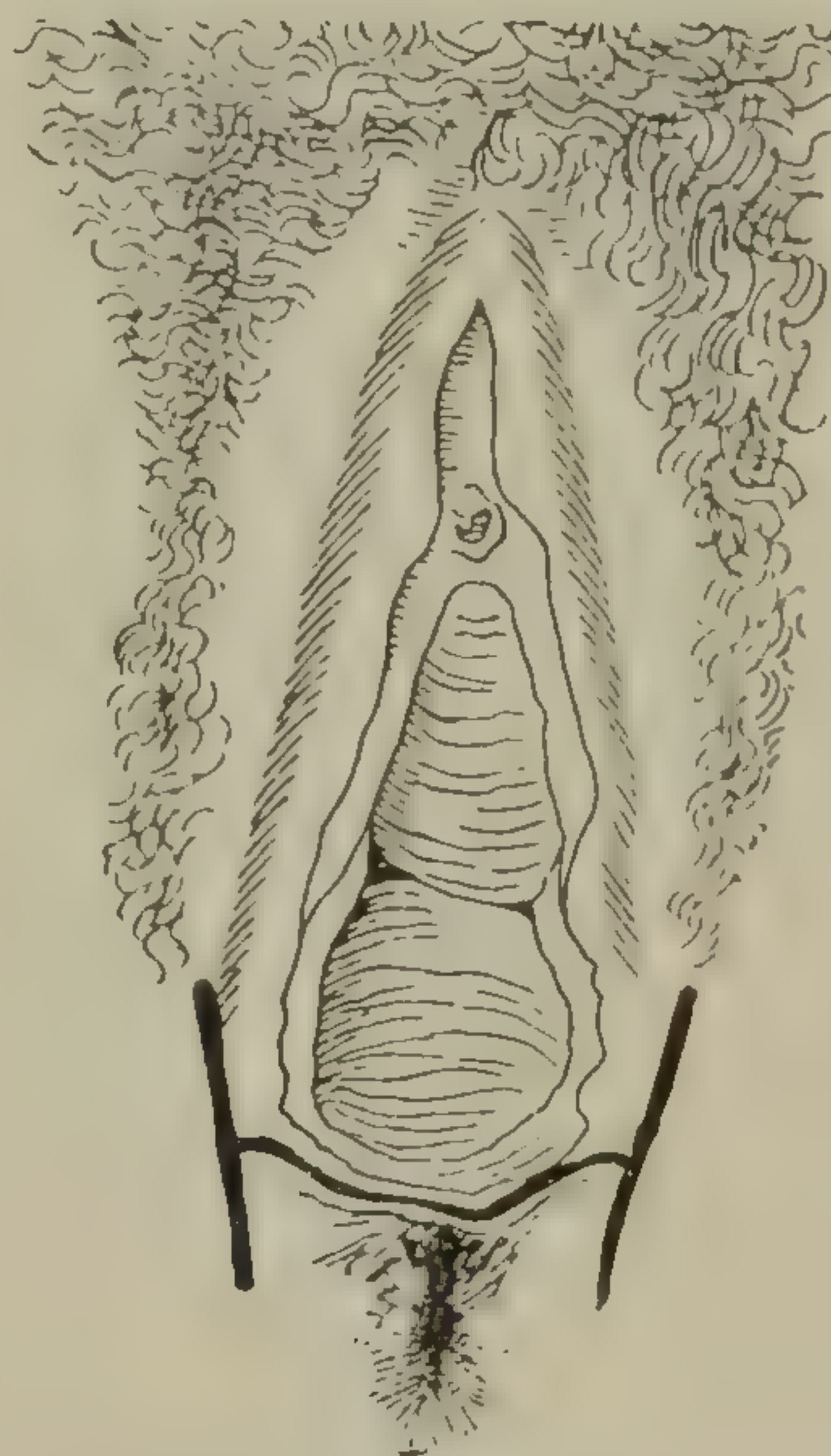


FIG. 50.—Flap-splitting operation for complete laceration of the perineum. Lines of incision.

One or two more are similarly inserted farther back, according to the size of the denuded surface. The first ligature is then tightened, after that the remainder. Instead of passing the sutures through the skin, Tait recommends their being passed just within the edge of the wound. The almost inevitable puckering of the vaginal flap is corrected, by short interrupted catgut sutures passed from one mucous surface to the other, through its whole width.

In complete laceration, the scissors are made to enter the recto-vaginal septum forming the isthmus and, after splitting it and making the anterior incisions, the scissors are re-entered, and an outward and backward incision is made on each side, so as to reach and denude the retracted ends of the sphincter ani. The rent in the septum, if any, together with the margins of the sphincter, are approximated in the same manner as already described, after which the sutures are introduced precisely as in the incomplete form.

COLPO-PERINEORRHAPHY.

Hegar's operation. Incomplete rupture. As the name implies, there are two parts to the operation, that which narrows the vagina, and that which approximates the muscular fibres. The former is entirely intra-vaginal, the latter partly vaginal and partly perineal. On each side, at points, *b, c*, (Fig. 52), corresponding to the original commissure, the mucous membrane is caught up and nicked. High up on the posterior vaginal wall, above the rectocele curve, *a*, a similar mark is made and the three points united by lateral linear incisions. The apex of the triangle is seized, and the flap dissected down to the base of the triangle, *bc*, which forms the margin of the laceration, and there cut off. Deep buried catgut sutures, alternating with superficial ones, 1, 2, 3, 4, 5, 6, 7, 8, 9, passing through the

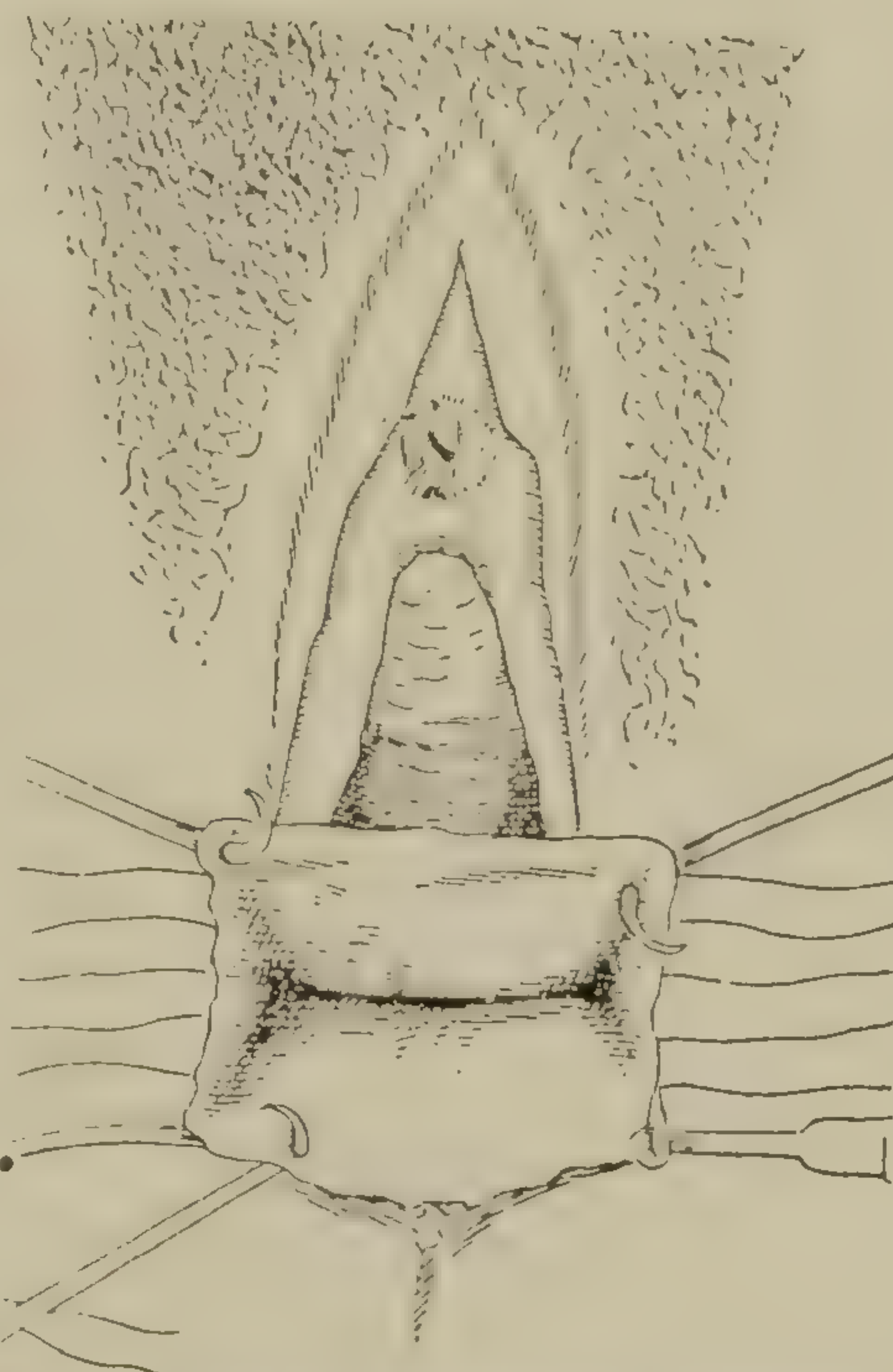


FIG. 51.—Flap-splitting operation for lacerated perineum—Appearance of wound and introduction of sutures.

the margins of the denuded surface, are inserted from above downward, which, when tied, unite, *fa*. A silkworm suture is carried up under the wound, from a

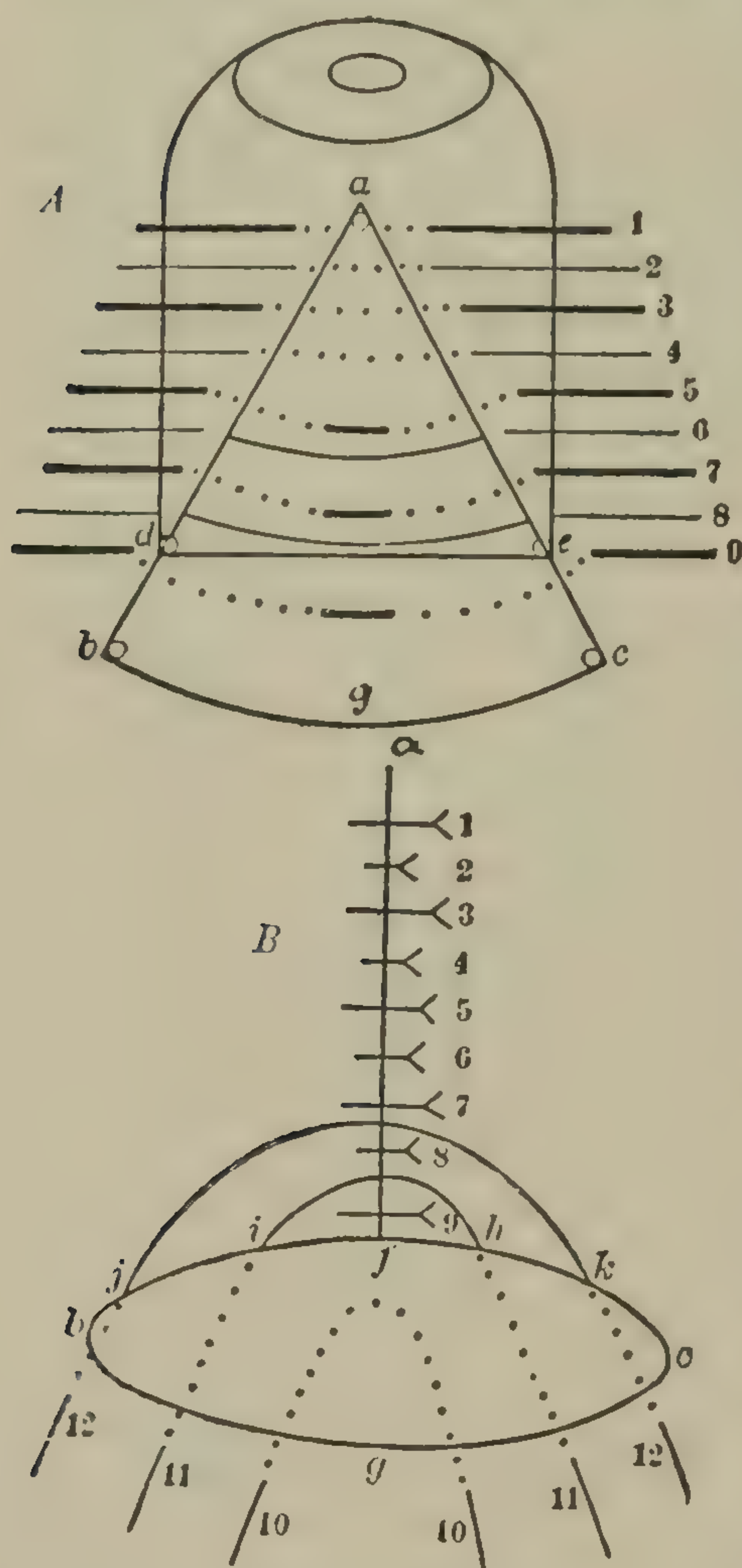


FIG. 52.—Hegar's Colpo-perineorrhaphy : sutures 5, 7, and 9 slant downward toward the entrance, and are brought out about a quarter of an inch from the median line ; B, the triangle shown in A having been closed, the perineal sutures are inserted—10, all buried; 11 and 12, partly free—all in a slanting direction.

point a short distance from the median line, *g*, to a point near the closed line, *f*, and down to the corresponding point on the other side. The second suture is inserted midway between the first and the point, *c*, brought out on the edge of the denuded surface at, *h*, reinserted on the other side at, *i*, and brought out through the skin at a point corresponding to its entrance. The last suture is inserted near, *c*, brought out at, *k*, reinserted at, *j*, and brought out through the skin near, *b*. After being tied, a few superficial sutures may be inserted to ensure coaptation.

Complete laceration. A point is taken at, *x*, in the median line, an inch above, *e*, (Fig. 53), the upper point in the rent in the recto-vaginal wall. Two others, *a*, and, *b*, located at the lower end of the labia, at points

where we desire the new commissure to be, are next marked out. Commencing at, *x*, a curved incision is made along the line, *xnb*, and then curved downward, along the line, *bd*, to, *d*, the point indicating the torn end of the sphincter.

A similar incision is next made on the other side; the points, *d*, and, *c*, are carefully denuded and made to communicate with each other by carrying the denudation across the recto-vaginal septum, removing all cicatricial tissue there. The surface thus mapped out is finally denuded. Sutures are inserted from side to side, under the whole raw surface represented by, *xmn*.

Next the sutures in the recto-vaginal wall, if any are required, are inserted, followed by those for coaptating the sphincter, after the manner already described. Next the lines, *ma*, and, *nb*, are brought together by

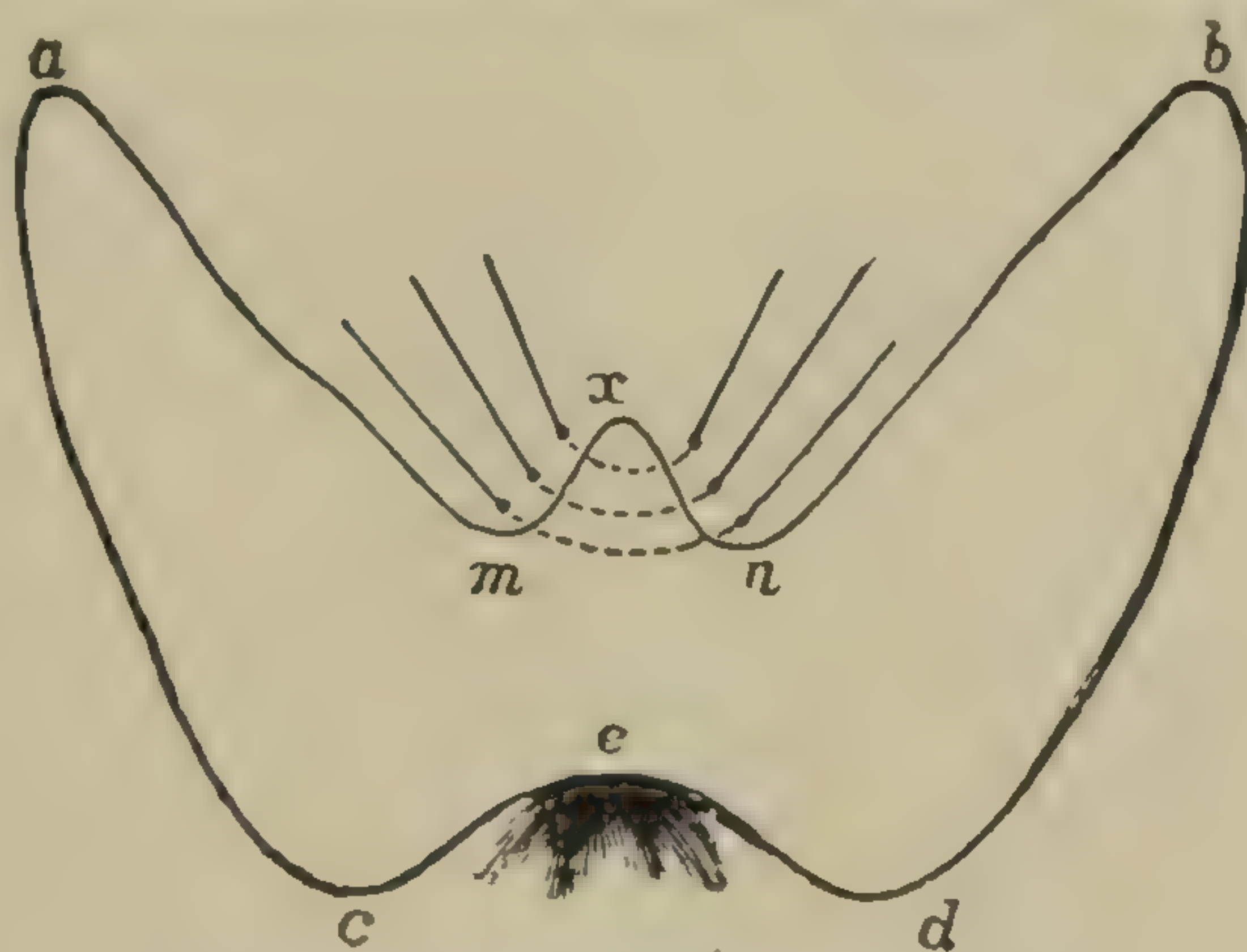


FIG. 53.—Hegar's operation for complete laceration of the perineum.

deep catgut sutures, reaching half way under the raw surface, and further coaptated by superficial ones. Finally four or five silkworm sutures are placed rather superficially on the perineal surface.

Emmet's operation. The top of the rectocele, *R*, is caught up with a tenaculum, and other tenacula are inserted at the highest caruncula myrtiformis on each side, *T*, *T1*, (Fig. 54), while a fourth is inserted at the median line, *H*, in front of the anus. By drawing in divergent directions on all four tenacula at the same time, a rhomboidal part of the mucous membrane of the vagina is put moderately on the stretch, with two triangular-like surfaces, apex upward, extending outward and upward in the lateral sulci of the vagina. The mucous membrane is now removed from the "M" shaped space, particular care being taken to go deep enough into the sulci. The insertion of the sutures is begun at the upper angle of one side, passing them from the outside towards

the median line, not straight across, but first downwards and inwards to the centre of the denuded surface, and then upwards and outwards through the tongue of the central flap. A series of four or five of these sutures are passed and at once tied. Having completed one triangle, and the other treated in the same way, a roughly quadrilateral raw surface will still be found to be left. A full-curved needle, threaded with silkworm, or silk, is entered through the skin, at the upper and outer angle of the wound, near the point, *T*, and made to enter laterally

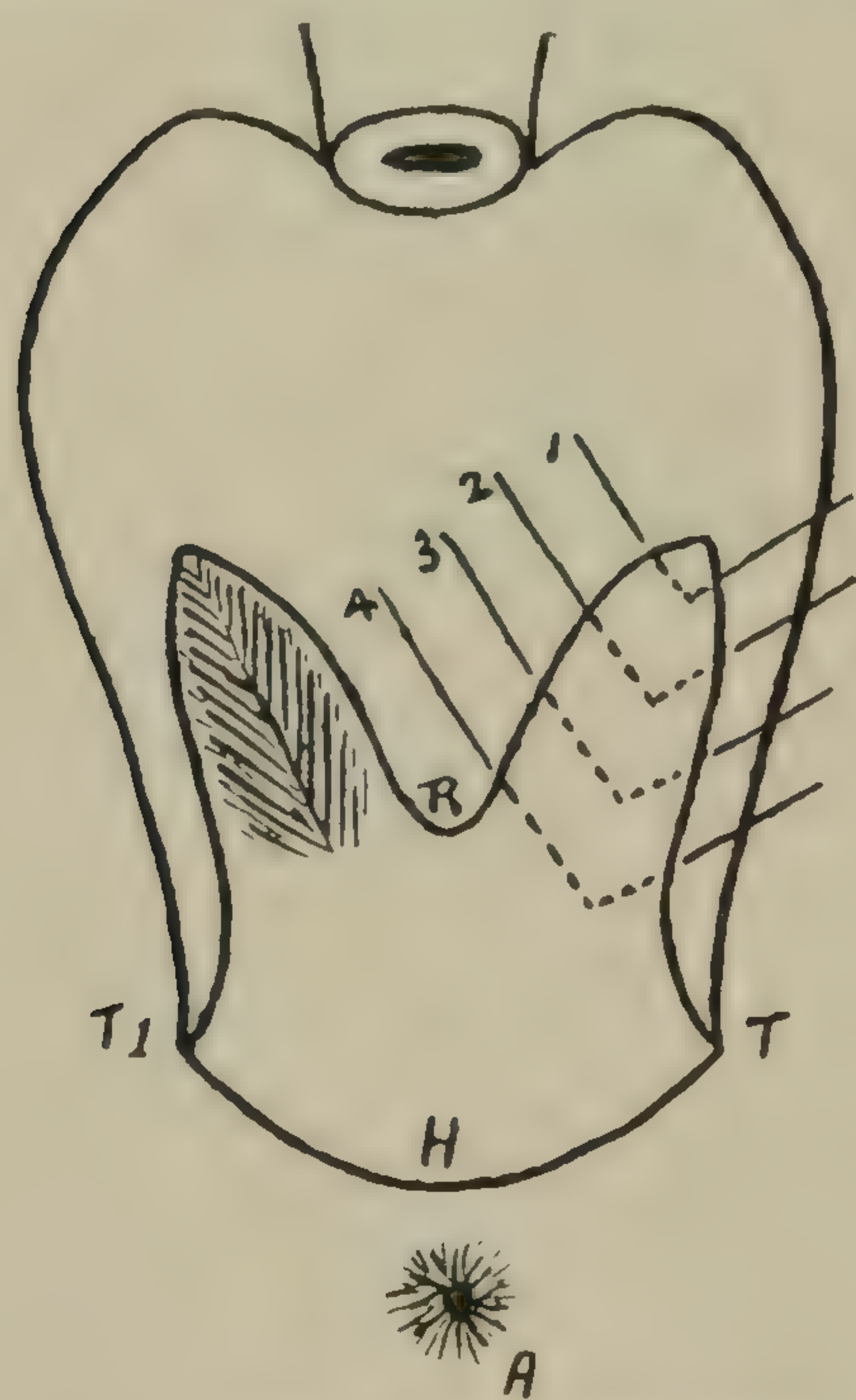


FIG. 54.—Emmet's colpo-perineorrhaphy. Denudation complete, and sutures inserted in left triangle.

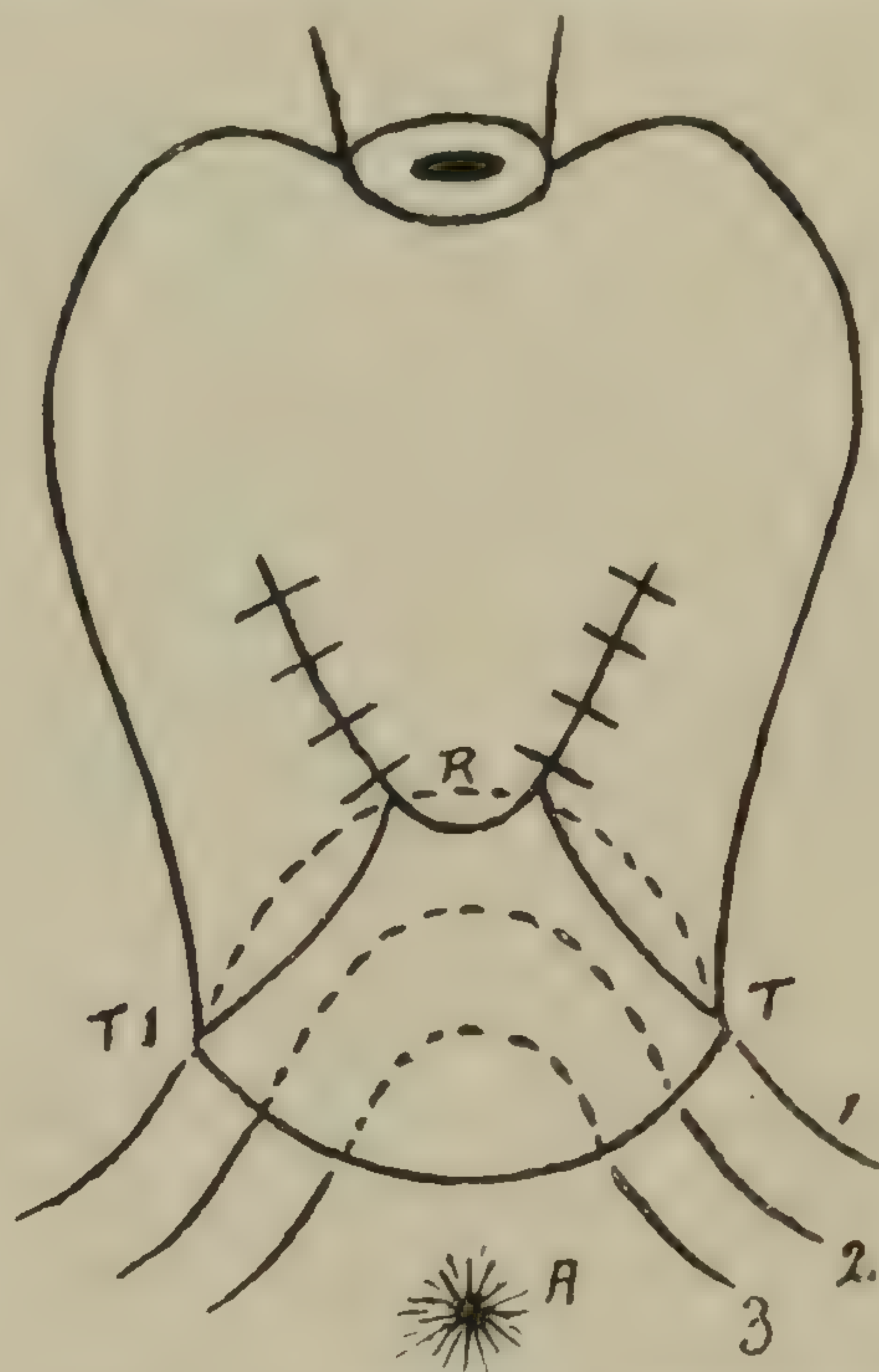


FIG. 55.—Sutures in both lateral triangles tied, leaving quadrilateral denuded surface with sutures inserted.

deep into the tissues, after which it is curved up under the raw surface to the tongue of the flap, under the tip of which it is passed. The needle is next made to traverse a similar course and emerge through the skin at a point, *T1*, on the opposite side. This is sometimes called the "crown stitch." Half an inch nearer the anus another suture is inserted, and made to travel under the denuded

surface lower down, after which a third and fourth, if necessary, are placed in the same order. The first suture is then drawn up and tied, the effect of which is to bring, *T*, *T'1*, *R*, together and form a new commissure by reuniting the upper angles of the original lacerated surfaces, and interposing between them the crest of the rectocele. The remaining sutures are tied in order, and, if necessary, a few coaptation sutures inserted.

Emmet's operation for complete laceration is somewhat similar to the method described as Hegar's, and thus a separate description is scarcely required.

CHAPTER XVI.

DISEASES OF THE VAGINA.

MALFORMATIONS OF THE HYMEN.

The hymen is a small crescentic membrane which separates the vulvar cleft from the vaginal canal, and may be considered as the portal to the vagina. There are many conformations of the hymeneal membrane all of which may be perfectly normal and physiological (Fig. 8).

Absence of the hymen. The hymen may be entirely wanting, or only a trace of it may be present, even though the genital organs are perfectly normal, but such a condition is exceedingly rare.

Atresia hymenalis, or imperforate hymen is a malformation in which the hymen forms an imperforate diaphragm. This condition prevents mucous, cast-off epithelial cells and menstrual blood from passing away by the natural channel, and permits of its accumulation above it. In childhood no bad effects will be noticed, except in rare instances arising from accumulation of mucous. After puberty, the constant repetition of the menstrual period causes an accumulation of blood in the vagina (*hæmato-colpos*), which, by reason of absorption of the serum,

shrinkage of the corpuscles, and admixture of the mucous, becomes converted into a thick, dark brown, tarry mass. The girl possessed of such an abnormality has the symptoms of menstruation every month, but no blood is seen. The increase of menstrual blood causes pain, which becomes aggravated each month, and with it occurs the formation of a tumor gradually growing in size from below, upward. If the symptoms of menstruation have persisted for several months, probably enough blood will have accumulated to distend fully the vagina, and to

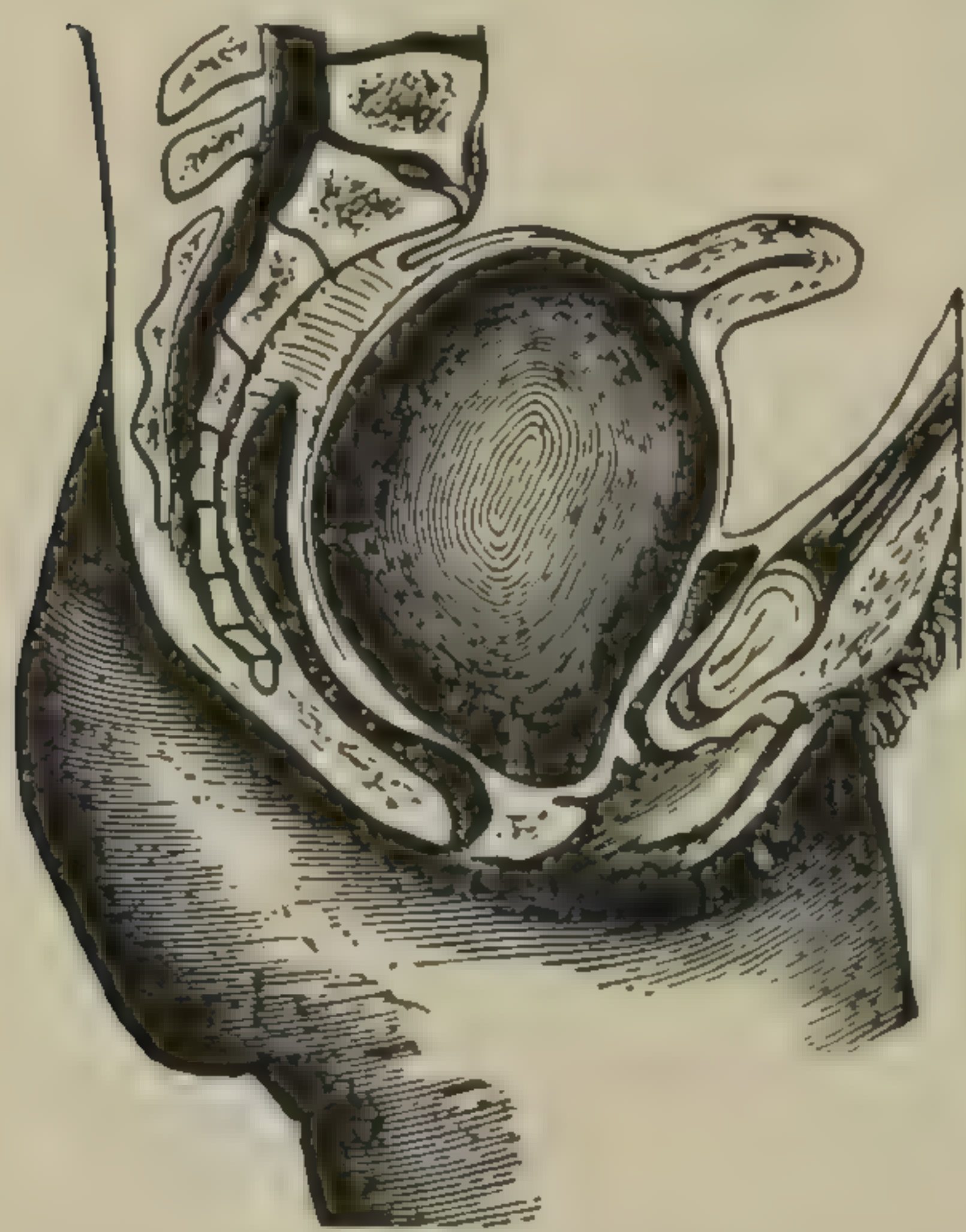


FIG. 56.—Atresia of the vaginal outlet.

cause a bulging of the imperforate hymen. The cervix may next become dilated and distended, the two forming one globular mass, on the top of which may be felt the undilated body of the uterus. The body of the uterus itself may take part in the dilatation (*hæmato-metra*), so that on making a bimanual examination there will be found, lying between the vulva and the hypogastric region, a globular, tense, very slightly fluctuating body, corresponding in

outline to the distended uterus, a wave of fluctuation being transmitted from the fundus uteri to the protruding surface at the vaginal orifice. The Fallopian tubes may, in their turn, form large tumors, filled with blood (*hæmatosalpinx*), the blood contained in them being not always pressed out from the uterus, but coming sometimes from the mucous membrane of the tubes themselves.

A *diagnosis* can very easily be made, when the history, symptoms and subjective signs are taken into consideration. The tumor formed may nearly fill the pelvic cavity and, by pressure, produce vesical and rectal symptoms. It may form a tumor in the perineal region,

as large as a foetal head, which flattens out the frenulum, and is continuous with the skin on the distended perineum and labia of the vulva, in front of which will be found the meatus. The dangers arising from such a condition are self evident. Spontaneous rupture through the hymen is very rare, hence, if left alone, it may lead to rupture of the vagina, uterus, or tubes, and even operative interference is not without its dangers.

Treatment. When the tumor is small and confined to the vagina, a crucial incision, or one made by cutting along the insertion of the hymen, is to be made, the cavity irrigated with a warm alkaline solution, such as soda bicarbonate, or liquor potassæ, and subsequently with a 1 to 2000 sublimate solution. To prevent septic absorption, the cut margins may be touched over with the thermo-cautery, and some strips of iodoform gauze introduced to allow for free drainage. When the accumulated mass occupies the uterus, the dangers arising are those of rupture of the tubes and sepsis. To avoid the former, the utmost delicacy in manipulation must be observed, and no attempt at rapid evacuation made by pressure on the tumor or otherwise. To avoid the latter a large opening should be made and the accumulated fluid carefully washed away, the cavity irrigated and free drainage established. If hæmatosalpinx can be made out before operation, it is best to remove the distended tubes first, together with the ovaries. The subsequent treatment will consist in irrigation with antiseptic solutions and in maintaining free drainage until involution has been well established.

MALFORMATIONS OF THE VAGINA.

Atresia and Stenosis. The term *atresia* signifies an imperforate condition, and in its strict import is limited to complete closure of an aperture or canal. Any obliteration or occlusion so extreme as to remove the case from the class of strictures, and yet is not complete, is

styled *stenosis*. Some authorities use the term *atresia* to signify both conditions, marking the divisions by the terms *complete* and *incomplete*.

The vagina, in foetal life, is created from the approximation and amalgamation of the Mullerian ducts upon the median line, and to arrest of development of these parts a great variety of congenital malformations are attributable. There may be no trace of the vaginal canal, the ducts of Muller seeming to have failed entirely to



FIG. 57.—External appearance of double vagina. *a*, *b*, vaginal orifices.

develop; there may be a distinct fibrous cord marking the site which it should have occupied, some slight development appearing to have occurred; development may exist for some distance up the canal, failure having taken place above; or one duct may have developed in part above and another below, giving two cul-de-sacs, separated from each other by impervious tissue. Not rarely the whole canal is ill developed, and the hymen guarding its outlet a closed unyielding membrane—a con-

dition often combined with an infantile uterus. The vagina may be divided by a more or less complete longitudinal partition into two halves, each of which corresponds to one Mullerian duct—a condition often combined with double uterus. Double vagina may be combined with atresia on one or both sides, and if one side is pervious, the condition may be overlooked for a long time. While congenital defective development is one of the frequent causes of atresia and stenosis, it may occur as a result of injury from mechanical, chemical, or pathological agencies. A vagina once fully developed may close entirely from adhesions of its walls, or its calibre may be diminished by absolute removal of its

component structures in consequence of sloughing produced by impaired vitality, by prolonged or difficult labor, by chemical agencies locally applied, or by syphilitic or other extensive ulceration.

Symptoms. The condition will demonstrate its existence only by incapacitating the vaginal canal for the performance of its functions. Should it occur in one too old, or too young, to require such functions from the vagina, it may attract no notice. Amenorrhœa alone, or combined with those symptoms of retained menstrual blood already described when speaking of imperforate hymen, or inability to perform the act of coition, will probably first bring the sufferer under notice. On making a physical examination, the entrance of the finger into, or up the vagina, will be found difficult or impossible. Investigation will prove that it is not due to vaginismus, or adhesion of the labia. The introduction of a sound into the bladder, and the finger into the rectum, may discover the canal running up as a fibrous cord, or no trace of it whatever may be found. Double vagina can generally be very readily made out, but when there is atresia on one side the diagnosis may not be so easy. In this there will be a menstrual discharge from the open side and retention in the other half, forming a hæmatocolpos or hæmatometra. From mere occlusion of the vagina there is no immediate or direct derangement, but in those cases where there is retention and accumulation of menstrual blood in the portion of the canal above the stricture, or in the uterus, the danger assumes the same proportions, or even greater than in imperforate hymen.

Treatment. The possibility of removing the abnormal state will depend upon the extent and completeness of the obliteration, or upon the destruction of tissue. General narrowness, due to arrest of development, may be successfully treated by the introduction of graduated dilators, and the treatment kept up until it has reached the normal

size. When atresia occurs from the presence of a membrane above the hymen (*septum retro-hymenale*), it is to be treated on the same principles as for atresia of the hymen.

If, in complete congenital closure or absence of the vagina, the uterus be found to be absent also, no attempt should be made to make a vagina, as it is hardly justifiable to expose the patient to the dangers of operation merely in the hope of forming an organ of copulation, besides the artificially formed vagina is apt to close again. The situation is entirely different when there is a uterus, with attempts at menstruation or retention of the menstrual flow. Under such circumstances operative interference is imperative. The patient is placed in the dorsal position and the legs elevated by Clover's crutch. A transverse incision is made midway between the urethra and anus. The operator works his way slowly and very carefully up between the bladder and rectum, insinuating his way with fingers and closed blunt scissors, keeping at the same time a metal catheter in the bladder. The left forefinger in the rectum will locate the position of the cervix and indicate the direction in which the operator must work to reach it. After reaching the cul-de-sac and the cervix exposed, the opening is stretched, accumulations removed if present, observing the same care as heretofore expressed, and the parts carefully irrigated. A few strips of iodoform gauze may be introduced into the fornices, after which a hollow glass tube covered with gauze, and proportionate in size to the new formed vagina, is inserted and held in position by a "T" bandage. The tube should be worn for a month at least, during which it should be taken out daily and the parts irrigated. Subsequently the plug should be worn for an hour each day during a whole year. If absence of the vagina is combined with absence of the uterus, but active ovaries present, they should be extirpated.

In double vagina, if the septum interferes with coition, it may be split lengthwise and the margins touched with the thermo-cautery. Double vagina, with unilateral or bilateral atresia and retention of the menstrual fluid, may be mistaken for hæmatocele, or a uterine myoma, unless the history of the case is carefully taken into consideration. Unilateral atresia may be treated by introducing a speculum into the open half, and opening into the other by means of scissors or thermo-cautery. In double atresia one side may be opened first, as in atresia of the single vagina, and afterwards the septum incised.

Faulty communications. As a result of arrest of development other conditions are sometimes met with. There may be complete atresia, or absence of any opening on the cutaneous surface leading into the intestinal or uro-genital canal, while under the skin is found a common cloaca, into which open the bladder, vagina and rectum. In other cases the vagina and urethra apparently open into the rectum, being cases of persistent cloaca. The partition between the rectum and the uro-genital sinus may have been formed, but the urethra seems to open into the vagina—a condition due to persistent uro-genital sinus.

VAGINITIS.

Vaginitis is the word commonly used to designate inflammation of the vagina, but some authors, however, have substituted the word *colpitis* or *elytritis*.

Under this term is comprised so many different conditions that it is necessary to admit certain divisions and subdivisions of the subject. Thus the intensity of the symptoms and the length of time which the disease lasts, classifies it as *acute* or *chronic*. It is called *primary* when it appears first in the vagina; *secondary* when the inflammation invades the organ from another part.

Taking the chief features of the disease into consideration, vaginitis may be classified as *simple*, *gonorrhæal*,

and *granular*, and to this classification may be added the *aphthous*, *cystic*, *adhesive*, *vesicular*, and *emphysematous*, as forming less important varieties.

Ætiology. Any influence which injures the vaginal epithelium, such as long continued friction from foreign bodies, or chemically irritating secretions or injecta, diminishes the resisting power of the vaginal mucous membrane. If accompanied by lack of drainage, and the consequent accumulation of secretions, bacteria multiply, infection follows, and vaginitis results. Among the *predisposing causes* may be mentioned anæmia; chlorosis; constipation; any of those causes which tend to produce unhealthy conditions of the skin; pregnancy; abdominal tumors, or other conditions which tend to produce pelvic congestion. Masturbation; pin worms; pessaries; tampons; chemical irritants; retained secretions; pathological secretions from the uterus, urethra, or vulva, or infection introduced from without, such as gonorrhœal pus, may be enumerated among the *exciting causes*. The exanthemata are held accountable for a small share of the cases.

Pathology. In the acute stage of simple vaginitis, hyperæmia and enlargement of the papillæ take place, with small celled infiltration of the epithelial structure. The epithelium on the summits of the papillæ is shed, but between them it is thickened. The discharge in some cases is thin and slightly acid; in others it is alkaline and thick; in others purulent. In the chronic form the deeper layers of the membrane become infiltrated, with loss of epithelium in some places, giving rise to ulceration. When caused by chemical irritants, such as strong solutions of iodine, a sort of vesication may occur, with exfoliation of large layers of epithelial tissue having the appearance of a false membrane. In the gonorrhœal variety the changes are similar to those mentioned, but more pronounced. The papillæ are larger and more vascular, the vestibule and inner surfaces of the labia

participate in these changes, while the discharge from the first is muco-purulent. Later the discharge becomes thinner and more distinctly purulent, and may give rise to infection of the urethra, vulva, and vulvo-vaginal glands.

Granular vaginitis differs chiefly by the more pronounced enlargement of the papillæ and by more extensive exfoliation of the epithelium covering them, causing the surface to resemble a mass of granulations.

Adhesive vaginitis is a disease of children and old people. In them the papillæ are smaller and the epithelial layer thinner. The inflammation is usually found more in patches, the secretion scanty, the surface smoother, and often ecchymotic in spots. The opposed surfaces tend to agglutinate, and by this means the lumen of the fornices, or even of the whole vagina may become obliterated.

Cystic or follicular vaginitis consists of an inflammation in the follicles occasionally situated about the vaginal fornices, causing the retention of their contents and the formation of small cysts.

Aphthous vaginitis arises from a development of the *oidium albicans* on the congested or more or less eroded vaginal surfaces, giving rise to whitish patches.

Vesicular vaginitis gives rise to round vesicles situated on inflamed areas, which, after bursting, leave sharply defined raw surfaces about the size of split peas.

Emphysematous vaginitis is an inflammation of the vagina characterized by the development of fluid and gas in the small spaces and canals of the connective tissue and lymphatics at the upper end of the vagina. They project like little bladders on a raised hyperæmic base, produce a crackling sensation when felt, and collapse when punctured. Pregnancy favors the development of this form.

Symptoms. Acute vaginitis is indicated first by a dull pain in the pelvic region, and a sensation of heat and fullness in the vagina, accompanied by a slight rise of tem-

perature and a feeling of malaise. There is a discharge which is at first scanty, but rapidly increases in amount, and often possesses a disagreeable odor. Micturition and defecation become painful, conditions which may soon be followed by severe urethral and vesical symptoms, such as frequent urination accompanied by burning pain and vesical tenesmus. Urethral and vesical symptoms indicate with fair certainty that the causative agency is one of gonorrhœa, particularly if accompanied by pain or tenderness in the inguinal region. Digital examination shows the vaginal orifice to be sensitive, the canal hot and swollen, and at a later period roughened. If the urethra be involved, it will be found thickened and tender, and pressure along its course may cause a drop of pus to exude from the meatus. Pus from this quarter is said to be conclusive evidence of gonorrhœa also, as gonococci thrive best upon its mucous membrane. If the bladder becomes infected, pressure on the vaginal wall will reveal the fact by the marked increase in the pain produced. Inspection will show the vulva acutely inflamed and covered with a muco-purulent or purulent discharge.

The symptoms of chronic vaginitis are similar, but less pronounced. In some cases symptoms of importance are absent altogether, and nothing, except a leucorrhœal discharge, calls the patient's attention to her condition. It may follow the acute stage, but more often is, from the first, a subacute or chronic process, such, for instance, as that form which develops in consequence of discharges from the direction of the uterus, or as the result of senile changes. The more acrid and abundant the discharges become, the more likely will they produce vulvitis and pruritus. Touch and sight reveal the roughened surfaces and, if of the gonorrhœal form, vegetations are not uncommon. With the symptoms described, a vaginitis should not be confounded with any other lesion, but it is not always easy to distinguish one form of vaginitis from

another. The presence of the gonococcus may establish the presence of one form, but its absence is not adequate proof of the absence of such infection. Corroborative evidence in its favor is found, however, in other directions, the prominent points of which have already been related when speaking of vulvitis.

Treatment. Simple acute vaginitis is readily controlled and cured by keeping the patient at rest, by freeing the bowels with mild cathartics, and by the copious use of douches, consisting of a strong aqueous solution of boric acid, borax, or of bicarbonate of soda, at a temperature of 105° to 110° F., every four hours, the vagina being stretched by means of a wire speculum to permit of its application to every part. If the tenderness is so great as to exclude the use of such an instrument, a soft catheter may be used, aided by hot alkaline fomentations applied to the external genitals. If there is a suspicion that it is of a gonorrhœal type, or in cases in which the simple form does not readily yield, the fluid used for douching should contain instead of alkalies, bichloride of mercury 1 to 5000. If the disease shows a tendency to become chronic, more energetic local measures become necessary. Through a Sims' speculum, the vaginal walls are to be carefully cleansed with green soap and warm water, then wiped over thoroughly with a solution of bichloride 1 to 1000, followed by another washing of warm water. After carefully drying with absorbent cotton, the vagina is to be lightly packed with plain or borated absorbent cotton, or the surfaces kept apart by the introduction of three or four thicknesses of gauze. This treatment should be repeated daily, until the disease is conquered. In the chronic form, the same careful cleansing is to be carried out but, instead of the bichloride, the entire surface is to be painted with a five per cent. solution of nitrate of silver, after which gauze is to be inserted as before and allowed to remain for twenty four hours. This treatment

should be given every three or four days, and in the intervals warm borax douches night and morning. Treatment by dry powder, such as equal parts of bismuth and chalk, or tannin and chalk, and kept in place by a cotton tampon, often proves serviceable when there is a tendency for the discharge to linger. The powder and tampon should be removed every day, the old powder being douched out just before the treatment is repeated. Suppositories of tannin, oxide of zinc, or acetate of lead may be similarly used, with equally good results. In the senile and vesicular forms, mild antiseptic douches are indicated, supplemented by strips of lint smeared with a two per cent. carbolized oxide of zinc ointment and introduced within the vagina.

Neoplasms. Cysts are rather frequently found in the vagina of adults or, as congenital formations, in new born children. They are usually single, globular or oblong, and for the most part sessile, but may become pedunculated. They vary in size from that of a pea to a goose egg, but may, exceptionally, reach the size of a foetal head at full term. The contents may be serous, yellowish, purulent, or thick and chocolate colored. These cysts may have different origins. They may be formed by condensation of the peri-vaginal connective tissue around an extravasation of blood, or they may be simple retention cysts. Remains of an ununited duct of Muller or of the canals of Gartner may give rise to them. If small they may not give rise to any symptoms, but are discovered accidentally during delivery, or an examination. They may be diagnosed from a cystocele or rectocele by the introduction of a catheter into the bladder, or the finger into the rectum.

The *treatment* consists in making an incision over the tumor and enucleating the entire cyst wall, if possible. When unable to do this, removal of as much of the cyst

wall as possible is to be accomplished and the remainder cauterized and packed with iodoform gauze.

Fibroma and fibromyoma are rare. Their most common seat is in the upper part of the anterior vaginal wall. Originally they are globular, sessile tumors, but when their weight increases they have a tendency to become pedunculated, and may even protrude through the vulva. When they are small they are easily diagnosed by their elastic hardness, but when large they may be mistaken for a uterine pedunculated fibroid. If, however, the os can be reached, it will be undilated and no pedicle will be found passing through it.

Treatment. If sessile, it may be removed by making an incision over its longest diameter and, after enucleating it, the cavity closed by rows of superficial and deep catgut sutures. If pedunculated, the pedicle may be secured by ligature and the mass cut away.

Mucous polypi are very rare. In shape and structure they are similar to the mucous or glandular polypi found in the cervical canal.

Primary carcinoma is also a rare disease. As a rule it is secondary, either propagated by continuity from neighboring organs, or appearing as metastatic deposits from carcinoma in remote parts. As a primary affection it occurs in the form of epithelioma and submucous carcinoma. Epithelioma usually begins as a circumscribed projecting nodule on the posterior wall of the vagina, which soon breaks down on the surface and assumes the form of a raised, ulcerating, cauliflower-like mass, with everted edges. The submucous or diffuse variety commences as a flat area of infiltration, under the normal vaginal membrane, which spreads along and around the vagina, until the latter feels like a narrow opening through a mass of hard unyielding tissue. Ulceration and excavation sooner or later take place, with corresponding softening of the parts. The *symptoms* are at

first confined to a thin irritating discharge, which before long becomes offensive, bloody at times, and containing some tissue debris. Pain, radiating from the vagina, is soon experienced, and later the symptoms are those which characterize infection of the neighboring organs. The *treatment* consists in extirpating the diseased tissues, whenever possible, and thoroughly cauterizing the wound. When it is no longer possible to remove all the tissue, the surface may be curetted, and a solution of ferric chloride applied once a week, if it is tolerated that often. Astringent and antiseptic douches will help to diminish hemorrhage, destroy the odor, and prevent septic absorption.

CHAPTER XVII.

GENITAL FISTULÆ.

Genital fistulæ are abnormal avenues for fecal or urinary discharge, by means of which some portion of the intestine or urinary tract communicates with the genital tract.

Fecal fistulæ are formed by a communication between the rectum or the small intestine, and the uterus, vagina, or bladder.

Urinary fistulæ are formed by the bladder discharging into the uterus or vagina; by an opening from the urethra into the vagina; or by a ureter emptying into the uterus or vagina. They have been designated as *vesico-vaginal*, *urethro-vaginal*, *vesico-uterine*, *vesico-utero-vaginal*, *utero-vaginal*, *uretero-uterine*, and *uretero-vesico-vaginal*.

Vesico-vaginal fistula is a communication between the bladder and vagina, and is by far the most common form. These fistulæ may originate from protracted labors, in which the bladder has been compressed between the head of the child and the symphysis pubis sufficiently

long to produce a localized necrosis, and the necrotic tissue thus formed, coming away after a period of a few days, establishes the fistulous tract. They may also arise from direct injury to the tissues from the use of forceps, or from injury sustained during surgical operations in the neighborhood of the bladder, particularly hysterectomy. Other agencies may create them, such as pessaries, stone in the bladder, or the presence of other foreign bodies. The vaginal walls may be perforated by cancer, or by syphilitic or other ulcers, or by the formation of an abscess in the parietal tissues. Lastly, certain diseases, producing deficiency of nutrition, may cause localized sloughing of the vaginal walls.

Symptoms. The chief symptom is indicated by a more or less constant dribbling of urine from the vagina, accompanied by a disagreeable ammoniacal odor. By the passage of this irritating excrementitious material through a canal and over tissues not intended by nature to tolerate it, inflammatory action, pruritus, eruptions and excessive irritability are produced, and the vagina sometimes becomes covered with urinary concretions, and the vulva and thighs red and excoriated. If the fistulous orifice be a large one, even a superficial examination by touch will reveal the nature and extent of the lesion, but the opening may be so small, or so hidden behind the projecting cicatrix, that it cannot be discovered. For their detection a Sims' speculum should be employed, with the patient in the genu-pectoral position, injecting at the same time, if necessary, an infusion of India ink, cochineal, madder, indigo, or plain milk.

Treatment. A fresh fistula, even if of considerable size, may be much diminished, and sometimes closed altogether, by the use of warm vaginal douches, and by the internal administration of drugs to render the urine normal, such as salol, or benzoic or phosphoric acid, or benzoate of ammonia. When a fistula has been discovered

soon after parturition, it should be treated by such methods, as it is too early to resort to suture. The once favorite method of treating all varieties of these fistulae by cauterization has now, very deservedly, fallen into disuse under the influence of improved surgical methods.

Closure by suture at the seat of the fistula. This is the most reliable and satisfactory of all methods. The best time for operating is eight or nine weeks after confinement, at a period when the patient has regained her constitutional vigor, for in no operation in surgery is this more vigorously demanded. The *preparatory treatment* consists in the use of the same measures as have just been mentioned, namely, warm vaginal douches, the administration of drugs to render the urine unirritating, and the careful removal of incrustations. If cicatricial bands exist they are from time to time to be cut with a knife or scissors, and the vagina stretched by the introduction of a Bozeman's dilator.

Sims' operation. This operation may be divided into three parts; paring the edges of the fistula; passing the sutures; and approximating and coaptating the denuded surfaces. The patient is placed in Sims' position and a large broad-bladed speculum introduced into the vagina. The edges of the fistula are caught up with a tenaculum and, with scissors, the edges pared all round, to the extent of producing a raw edge one-third of an inch wide, and bevelled from the vesical mucous membrane outward to the vagina, care being taken not to implicate the former in the incision. Two sorts of sutures should be used in approximating the denuded margins, silkworm for the deep, and fine silk for the superficial stitches. Beginning at the most remote portion, a slightly curved needle is entered half an inch from the edge of the incision and brought out on the denuded surface, just under, but not including the edge of the vesical mucous membrane. After drawing the suture partly through, the needle is

introduced again into the raw surface opposite, just under the vesical mucous membrane, and made to emerge half an inch from the edge of the wound. The other sutures, five or six to the inch, are introduced similarly, and one at, or just beyond each angle of the wound. The sutures are then brought together and tied snugly, approximating the tissues without strangulation, after which the margins may be more carefully coaptated by superficial sutures. The ends of the sutures having been cut off, a loose iodoform gauze pack is placed in the vagina. A self-retaining catheter, preferably of soft rubber, may be introduced, after carefully washing out the bladder. Many surgeons prefer to trust to frequent catheterization for a

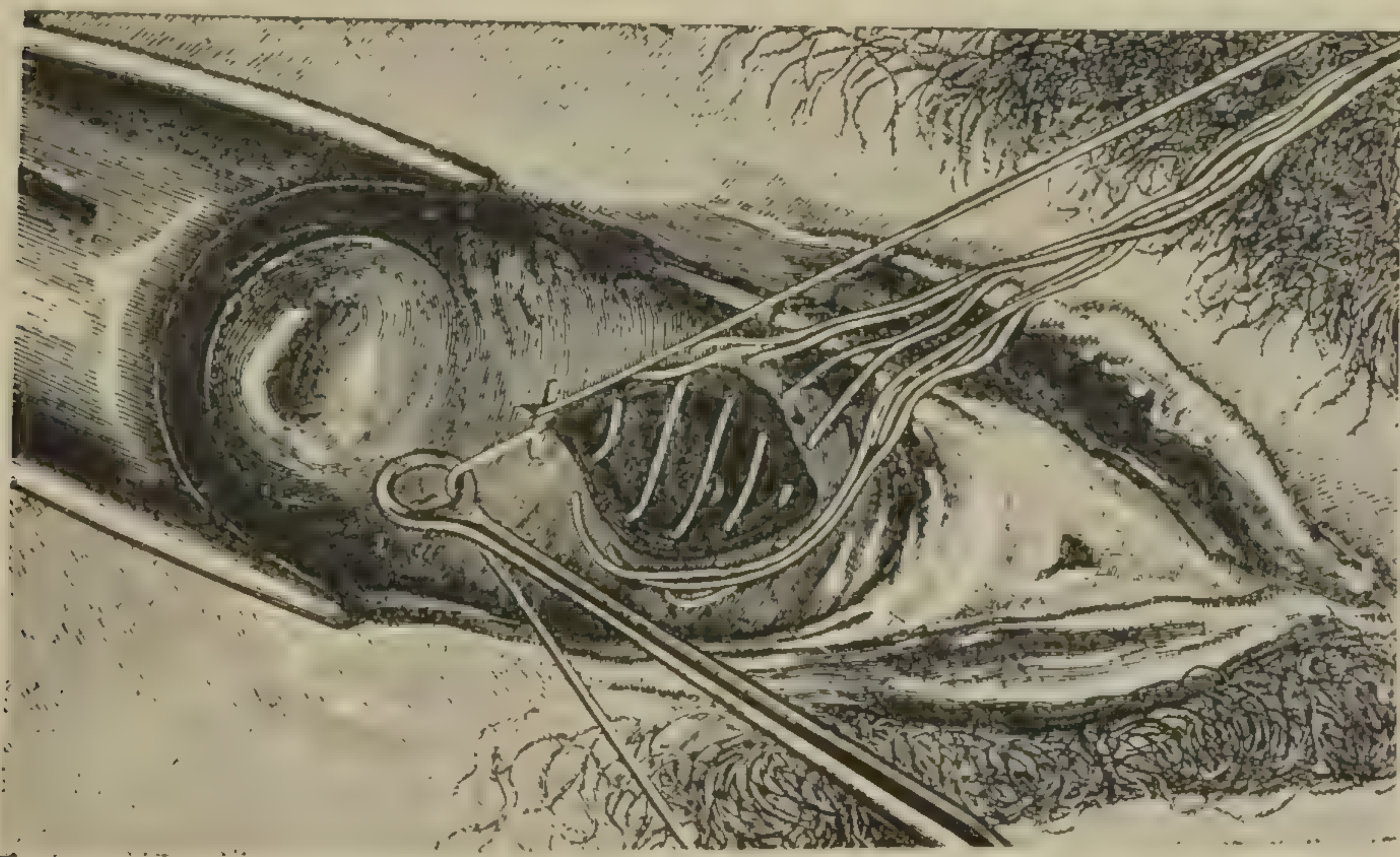


FIG. 58—Operation for vesico-vaginal fistula, denudation complete, and sutures in place.

few days, believing that the constant presence of the catheter keeps up continued vesical tenesmus and lessens the chances for immediate union. If the vaginal pack becomes wet or soiled, it should be removed, otherwise it may be left in place for two days, when it should be taken away, and the vagina allowed to remain empty.

When the operation was first perfected by Sims, silver wire, introduced by silk carriers, was used ex-

clusively, but it is found that silkworm serves equally as well.

Two other operations are generally described for the closure of vesico-vaginal fistulæ, namely, Simon's and Bozeman's, but as they differ mostly in the matter of technique, and in the method of procedure, it is not considered necessary to describe the various steps.

There is a *flap-splitting operation*, known as Blazius' method, and recently renewed by Lawson Tait and others. No tissue is cut away, but an incision is made parallel to the vaginal and vesical mucous membrane, on the white line of the cicatrix, to the depth of three-eighths of an inch. The vesical and vaginal flaps thus formed are separated and, in the cleft formed, a circular suture is introduced, which, when drawn up, approximates the raw surfaces all around.

Urethro-vaginal. In this variety the wall of the septum being very thin, the denudation must be extended over the nearest part of the vagina and the edges brought together from side to side over a metal catheter. If the tension is great, it may be relieved by making an incision on each side parallel to the line of union.

Vesico-uterine. From its anatomical relations, fistulous communication can only take place between the bladder and uterus at the cervix, except under rather rare circumstances. These fistulæ are produced in the same manner as vesico-vaginal fistulæ, and form small round holes opening through the anterior lip of the cervix. It, too, may be diagnosed by injecting milk or colored fluid into the bladder. Sometimes a probe can be brought from the bladder, through the fistula, into the cervical canal.

Treatment. This kind of fistula has an unusual tendency to spontaneous healing, and efforts of nature in this direction may be aided by cauterization. If that does not succeed it may be closed by operative procedure. After having split the cervix in the median line, so as to

reach the fistulous tract, and denuding its surfaces, sutures are introduced through the uterine and vesical walls, after which the incision in the cervix is closed the same as in trachelorrhaphy.

Vesico-utero-vaginal. In this variety the fistulous tract passes from the bladder through the anterior lip of the cervix and ends in the vagina. They are subdivided into superficial and deep, according to whether there is partial or complete sloughing of the anterior cervical lip. In the superficial form, good results may be obtained by simple denudation and suture, but the deep are rarely amenable to treatment by this method, and it is generally necessary to bring the posterior lip of the cervix in apposition with the vaginal edge of the fistula, and stitch the two together. The os uteri therefore will open directly into the bladder. This operation has been termed *vesico-hystero-cleisis*.

Uretero-vaginal. A uretero-vaginal fistula is situated on the anterior wall of the vagina, a little below and outside of the vaginal portion of the uterus, and is formed between the ureter and vagina. The causes are, difficult parturition, perforation of a pelvic abscess, prolonged use of pessaries, and vaginal and abdominal hysterectomy.

Diagnosis. By placing the patient in the dorsal position and exposing the vaginal vault, the fistulous opening may, with a little patience, be found, though it be only the size of a pinhead, or smaller. With a probe or ureteral catheter, it is usually possible to enter the ureter for some distance and see the urine coming out drop by drop. A catheter or sound passed into the bladder will reveal the absence of the probe there. Milk introduced through the urethra will not escape through the fistula. Cystoscopic examination will positively clear up the diagnosis. With the ureteral catheters introduced no urine will come from the catheter on the affected side, while on the opposite side it will issue drop by drop.

Treatment. All uretero-vaginal fistulae should be operated upon as soon as circumstances will permit, on account of the great liability of the kidney to become infected. Three operations are available, closure of the fistula, implantation of the ureter into the bladder, and nephrectomy.

1. **An elliptic incision** is made around the fistula, the ureter exposed, and a sound passed into its orifice. After freeing the ureter for about one third of an inch, an opening is made into the bladder, just above the end of the ureter, and, after removing the sound, the free end of the ureter is turned into this opening and held there by two or three fine sutures passing through the vesical and ureteral walls, but sufficiently superficial as not to encroach upon the lumen of the ureter. The vaginal incision is then closed carefully.

2. **If a vesico-vaginal fistula** does not already exist, one is made by the excision of an oval flap around the ureteral opening. The end of a very fine gum elastic catheter is then passed into the renal end of the ureter, and the other end into the urethra by way of the fistulous opening in the bladder. The genu-pectoral position is now assumed and the edges of the fistula denuded. A series of fine sutures are passed through the flaps, at right angles to the ureter, and tied. The catheter must remain in position for at least eight days, and the bladder kept empty for a portion of that time by a self retaining catheter or by frequent catheterization.

3. **Implantation of the ureter in the bladder.** (Ureterocystostomy). After opening the abdomen, the ureter is dissected out low down, and an opening made in the posterior wall of the bladder by cutting down on closed forceps introduced through the urethra. A flexible catheter is introduced into the ureter and pulled out through the urethra. The ureter is then fastened to the wall of the bladder by fine sutures, after which the flaps

of peritoneum are made to cover over and close off the point of entrance, fine silk sutures being also introduced for that purpose. If there is difficulty in selecting the proper point for opening into the bladder, it may be partially filled with boric acid solution, which is at once to be evacuated after the point has been selected. Finally a self-retaining soft rubber catheter is to be inserted through the urethra by the side of the ureteral catheter, after which the abdominal wound is closed.

Uretero-uterine fistula. In this variety the urine flows from the os, as in the vesico-uterine, but the methods adopted to differentiate between vesico-vaginal and uretero-vaginal and vesico-uterine will be sufficient to make a diagnosis. This form of fistula is exceedingly rare, and if abdominal implantation cannot be performed, relief may be obtained by turning the cervix into the bladder, by artificial closure of the vagina (colpo-cleisis), or by excision of the corresponding kidney (nephrectomy).

Indirect methods for the relief of urinary fistulæ have been devised. They consist in the closure of the genital canal, at a point below the site of the fistula, so that the portion of the vagina above becomes a part of the bladder, menstruation, if present, taking place into this viscus. Three varieties have been devised:—Antero-posterior closure of the vulva (episio-cleisis); complete vulvar closure with the formation of an artificial recto-vaginal fistula; and the obliteration of the vaginal canal transversely (colpo-cleisis). The two former have proved so unsatisfactory that they have been practically abandoned.

Colpo-cleisis. In performing colpo-cleisis care should be taken to preserve as much of the depth of the vagina as possible, and therefore closure should not be made at a lower point than necessary. A ring of mucous membrane is marked out on the vaginal wall, and with a sound in the bladder, the anterior surface is denuded, and with the

finger in the rectum, the posterior surface. Sutures are passed by means of two short half-curved stout needles, one at each end, the anterior needle being passed from above downward, under the denuded surface of the vesico-vaginal wall, and the posterior needle similarly, under the denuded surface of the recto-vaginal wall, and, after all are inserted, they are carefully tied.

FECAL FISTULA.

Fecal fistulæ are abnormal avenues for the escape of the contents of the small or large intestine, either by the vagina or by the bladder. Implication of the small intestine is comparatively rare, and that of the bladder extremely so. The fistulous communication may take place between the rectum and vulva, *recto-labial*; between the rectum and the vagina, *recto-vaginal*; or between the ileum or sigmoid flexure and the vagina, *ileo-vaginal*, or *entero-vaginal*.

The size of the opening varies. It may be so small as to be found with difficulty, or large enough to admit a finger. It may be situated anywhere between the intestine and vagina, but it is most commonly found either immediately above the sphincter ani or at the fornix. The *causes* of fecal fistulæ are in many respects similar to those determining urinary fistulæ, but the most common by far is child-birth. The *symptoms* are plain. The escape of flatus and, when the bowels are loose, of their fecal matter through the vagina, readily indicates the condition, but when the fistula is very small there may be some difficulty in locating it. Distension of the rectum with water will often bring the opening into sight.

Treatment. Many small fecal fistulæ have a decided tendency to close naturally, and this happy result should be facilitated by scrupulous cleanliness, sitz baths, rectal and vaginal injections, laxatives, and by an occasional light cauterization.

Recto-labial fistula is best treated as a fistula in ano. If the labial opening be near the rectum it may be cut through, the fistulous tract curetted or denuded, and either packed with gauze, leaving it to heal by granulation, or the surfaces brought together with deep sutures, to heal by immediate union.

Many operations have been devised for the cure of recto-vaginal fistulæ:—

1. *Emmet's operation* consists in splitting the perineal body up to the fistula, cutting its wall away, and uniting the same as in complete rupture of the perineum.

2. The *flap-splitting method* described for the cure of vesico-vaginal fistula often gives good results when the opening is small.

3. Make a broad denudation on the vaginal side and extending from the sound tissue deep down into the fistula. Deep and superficial sutures are passed from side to side.

4. Make a vertical incision in the median line, extending half an inch above and below the fistula, and dissect the vaginal from the rectal wall on each side, for a distance of half an inch. Unite the edges of the rectum by a continuous buried catgut suture inserted from the vaginal side, and afterwards the vaginal flaps by silkworm or chromic catgut.

Entero-vaginal fistula, when the opening is lateral, may be closed by denudation and suture like other fecal fistulæ. In the case of *vaginal anus* no attempt at closure must be made until it is ascertained that the lower part of the bowel is pervious.

In *ileo-vaginal fistula*, and in fistulous openings between the bladder and intestine, the only plan of treatment is to open the abdomen, find the fistulous tract, sever the adherent intestine if possible, and, by means of Lembert sutures, close the openings in both viscus.

CHAPTER XVIII.

DISEASES OF THE URETHRA AND BLADDER.

Malformations of the urethra. The urethra may be entirely absent, due chiefly to arrest in development of the vagina at a point where it should form the main portion of the posterior wall of the urethra.

The lower and anterior portion of the urethra may be absent (hypospadias).

Atresia of the urethra is a comparatively common affection. There are two forms mentioned: one is produced by imperfect development of the vaginal process, or of both the clitoral and vaginal segments, the urethra being open up to the bladder and there closed. The second form occurs when the clitoral and vaginal processes are both defective. In such cases there is no trace of a urethra, except an imperfect vaginal wall, which extends obliquely downward and closes the bladder. The symptoms which arise from malformation of the urethra are incontinence of urine in the one class of cases, and retention in the other. When the urethra is deficient in part, and the bladder perforate, urine constantly escapes. *Atresia* of the urethra and the consequent retention of urine causes hydrops of the bladder, ureters, and kidneys. Distention of these organs occurs *in utero*, and such malformed children are usually born dead, or die soon after birth. The evil effects of this malformation is sometimes naturally obviated by the occurrence of another developmental anomaly—fistula of the urachus and escape of the urine from the umbilicus. In making a diagnosis of these deformities, reliance cannot be placed on objective symptoms alone, and a physical examination of the parts becomes necessary. The general relative appearance of the external organs must be observed, aided by attempts at passing a sound into the bladder and by the intro-

duction of the finger into the rectum and, if possible, into the vagina.

Atresia of the urethra can only be cured by operation. When there is entire absence of the urethra with the existence of vesical fissure, or when there is persistence of the sinus-uro-genitalis with partially developed urethra, the production of an artificial canal has been suggested.

Malformations of the bladder follow the general rule, and are thus in most instances due to some defect in the normal process of development. *Fissure* is the most frequent and prominent anomaly. It consists in partial or complete absence of the anterior vesical wall, and is usually accompanied by malformations of other organs. It may be a simple fissure of the lower part of the bladder, with an opening about three quarters of an inch in breadth. A higher grade is that in which the fissure is near the umbilicus, the lower part of the pelvic cavity and the pubic symphysis being closed, and the lower part of the bladder, urethra, and external genitals normal. The highest grade (*exstrophy*) is that in which the whole anterior wall of the bladder seems absent, the inferior abdominal region much shorter than normal, and the umbilicus nearer the base of the pelvis. The abdominal walls are divided, and the resultant fissure is filled up by the bladder wall. The mucous membrane is puffed out and red, and gradually merges into the skin of the abdomen. On each side of the lower portion of the everted bladder are situated the orifices of the ureters. As a rule the urethra is absent, and the clitoris is either divided, or there may remain but a trace of it, or it may be entirely absent.

Double bladder may be considered as extremely rare. In such cases the double allantois, instead of forming one passage, forms two, with a ureter opening into each. Various explanations have been offered to account for the malformation; some attribute it to defect in the allantois

at an early period in embryonic life; some to a failure of the pubic bones to unite; some to atresia of the urethra, followed by over distension, the distended organ pushing aside first the recti muscles, later the cartilaginous pubic bones, and finally bursting.

Treatment. In the severer form no plan offers any relief except a plastic operation, and this is often only palliative. Even under the most favorable circumstances not much more can be done than to diminish the annoyance which comes from the flow of urine over the surrounding external surfaces. The operation which has given most satisfaction consists in dissecting a flap from the central part of the abdominal wall, immediately above the fissure, and large enough to close in the bladder completely. After vivifying the edges of the bladder wall, the abdominal flap is turned down and the edges stitched to it. A lateral flap is next taken from each groin, and brought together with their raw surfaces in contact with the raw surfaces of the central flap, and stitched to it.

Irritable urethra. A case will occasionally be met with, in which will be found pain and tenderness of the urethra, frequent desire to urinate, and pain in doing so, while a careful examination will fail to find any lesion. It very commonly follows catarrh of the bladder, or it may be the result of exposure to cold, or of some temporary or accidental irritation of the bladder. It may be very effectually treated by dilating the whole urethral canal with dressing forceps, or some form of dilator, the operation being repeated several times. An application of equal parts of carbolic acid and glycerine to the whole canal will materially aid in effecting a cure, although urination will be painful for several days after.

Urethritis. Urethritis is of three varieties, *acute*, *chronic*, and *gonorrhæal*. Acute urethritis, though not a very frequent disease, is a very distressing one, and often

difficult to relieve. In many cases it will be found to depend upon a specific cause, yet, like vaginitis, it is sometimes difficult to mark the difference. Simple urethritis comes on gradually, and is often preceded by symptoms of uterine or vesical disease, while the gonorrhœal variety comes on rather abruptly, and is preceded or attended by acute vaginitis and vulvitis. In both varieties there is painful urination, and a sharp, scalding sensation produced by the urine passing over the tender surface. The desire to urinate is not so frequent, or so urgent, as in cystitis, and in some cases the urine is retained for a long time, dread of pain on the part of the patient causing retention. During or immediately after micturition, in some cases, a few drops of blood escape, which may be recognized by its being exuded separately, and not intimately mixed with the urine, as is usually the case in hemorrhage from other portions of the urinary tract. Examination will show the meatus swollen, reddened, and the urethral mucous membrane somewhat prolapsed. The urethra is felt as a firm, tender cord, and, by pressure from above downward, a purulent fluid can be pressed from the meatus, in which, if the gonococcus is found, reveals the nature of the urethritis.

Cystitis, a disease apt to be confounded with urethritis, may be differentiated by using the catheter, and withdrawing the urine direct from the bladder for the purpose of examination. In the female, gonorrhœal urethritis frequently passes into the chronic stage, in which there are no subjective symptoms, the diagnosis depending wholly upon physical examination. A drop of thin milky pus may be obtained by pressure upon the urethra from behind forward, and the endoscope reveals the usual appearances of inflammation.

The treatment, whether specific or otherwise, is conducted on the same general plan. It consists essentially in rest, a mild diet, the use of alkaline drinks, hot vaginal

douches, warm sitz baths and saline laxatives. Much benefit may be derived from douching the urethra with water as hot as can be borne. When the more acute symptoms have subsided, injections of sulphate of zinc (1 to 500), or of nitrate of silver (1 to 4000), repeated four to six times a day, will often prove useful. The injection may be made with an ordinary urethral syringe, a pipette, or a reflux catheter specially adapted for urethral irrigation. In subacute or chronic cases, great benefit may be derived from douching the urethra two or three times a day, with hot water followed by the use of some astringent solution, while internally, oil of santal wood in ten minim capsules, or salol in five grain doses, may be administered.

Granular erosion. This very troublesome, but fortunately rare affection may result from urethritis, or it may appear without any previous disease. The mucous membrane is found covered with young, imperfectly developed epithelium, the papillæ hypertrophied and extremely sensitive, giving rise to most excruciating pain during micturition, and afterwards keeping up a most distressing tenesmus. In the treatment, mild measures do not accomplish much. The best results will follow dilatation of the urethra and painting the mucous membrane with a solution of nitrate of silver, a dram to the ounce, or of carbolic acid dissolved in glycerine.

Strictures of the urethra are far less frequent in the female than in the male. They are for the most part acquired, narrowing being extremely rare. The causes of cicatricial contraction are chronic urethritis, most frequently gonorrhœal; injuries during childbirth, or other forms of traumatism; caustic applications; and ulcers of syphilitic or tuberculous origin. The most satisfactory method of treatment is by gradual dilatation, as practised in stricture of the male urethra, by means of dilators, similar to those used for dilating the urethra for diagnostic purposes.

Prolapse of the urethral mucous membrane, urethral caruncle and venous angioma have already been considered when speaking of diseases of the vulva, (Chap. XIV).

Urethrocele consists of a sacculation of the middle portion of the urethra. It is formed, most frequently, by a bagging of the inferior wall, the upper wall deviating little, if at all, from its normal position. The symptoms are, for the most part, due directly or indirectly to the retention of a certain amount of urine in the sac. The residual urine becomes ammoniacal by decomposition, and finally purulent. The sac wall becomes inflamed and eroded, followed by general urethritis and perhaps cystitis. The sacculation is susceptible to the touch and ocular inspection, and when the pouch is large it protrudes from the vulva.

Treatment. If the sac be of the diverticular variety, with little urethritis, it may be wholly excised and the resulting fistula closed by suture. In the presence of much urethritis the sac should be left unclosed, to facilitate drainage and the use of remedial applications. After the parts have been restored to a comparatively healthy condition, the fistula may then be closed.

Irritable bladder. Under this heading may be grouped those conditions, either extrinsic or intrinsic to the bladder, which are not sufficient to induce organic disease, but which keep it in a constant state of irritability. The symptoms are such as to lead to a diagnosis of cystitis, but a careful examination shows the bladder to be normal, and we are forced to ascribe the symptoms to simple irritation of the peripheral nerves, either from direct or reflex causes. Probably the most painful form of irritable bladder is that following plastic or abdominal operations. Following cœliotomy, the urine is generally of high specific gravity, has a heavy sediment, consisting usually of amorphous urates and phosphatic crystals, and is

capable of producing great vesical irritability. After such operations too, the urine is frequently diminished in quantity, so as to suggest the possibility of nephritis or obstruction of one or both ureters, a condition capable of aggravating the bladder already irritated by the heavily charged urine. Irritability of the bladder will often be found to be present, as a reflex manifestation, in diseases of the appendages, in dislocation of the bladder, in urethral caruncle, in prolapse of the rectum or of the uterus, and it often accompanies hysteria or other severe emotional disturbances. The diagnosis can only be settled by making a chemical and microscopical examination of the urine; the former reveals nothing abnormal, the latter a field laden with amorphous urates or phosphatic crystals.

CYSTITIS.

Cystitis in the female is of frequent occurrence. It may be either *acute* or *chronic*, *local* or *general*, and may vary also greatly in intensity and duration, lasting from a few days to many weeks. The most frequent *cause* is the introduction of septic matter into the bladder by means of catheters, bougies, or other instruments. Cystitis, caused by extension of an inflammatory process, is a frequent result of vaginitis or urethritis, particularly of the gonorrhœal type. Mechanical injuries, retention and decomposition of urine, local chemical irritants, calculi and foreign bodies, are all potent causes of vesical inflammation. In the early stage of acute cystitis the mucous membrane is red and congested, but otherwise normal. Later the walls of the bladder become thickened and the mucous surface covered with pus, fibrin, and exfoliated epithelium, with, occasionally, small bleeding areas, where the epithelium has become detached. In the chronic form the dangers are still more noticeable; the muscular and fibrous coats are greatly hypertrophied, the bladder cavity much decreased by the thickening and

contraction of its wall, and the normal folds stand out as prominent ridges, and may even assume a polypoid form. Hemorrhages occur into the mucous membrane and appear as dark ecchymotic spots, which later change to slate color from partial absorption. As a rule when cystitis arises from habitual over-distension, the bladder walls are thin and parchment-like. In these cases the diphtheritic and croupous type of inflammation is most likely to occur. The entire mucous membrane becomes extensively involved, and is covered with a layer of fibrous material, or false membrane, which may be thrown off as a complete cast of the bladder. In more severe cases of diphtheritic cystitis, the membrane is composed, not only of necrotic mucous membrane, but also of the muscular coat. In some cases the diphtheritic process becomes localized and deep erosions or ragged ulcers result.

The urine is usually intensely alkaline and heavily laden with mucous and urinary salts, especially the phosphatic, and are often deposited as fine incrustations on the ulcerated areas. Microscopically, there will be found a large number of leucocytes, or red corpuscles, pavement epithelium, isolated, or in clumps, and often large numbers of crystals of triple phosphates. As a result of the hypertrophic thickening of the bladder walls, the vesical orifices of the ureters may be partially occluded, and dilatation of the ureters, pyonephrosis or hydronephrosis may result.

Symptoms. The symptoms will vary according to the cause, extent, severity and stage of the inflammatory affection. In the acute stage, pain, often severe, is felt above and behind the pubes, and radiating into the groin and down the thighs. The desire to void urine is almost constant, and the act is attended by sharp lacerating pain at the base of the bladder. Following urination there is usually a sensation as though a few drops of urine yet

remained, a condition sometimes so urgent as to cause the patient to remain for hours on the chamber. There is often a dull pain in the perineum, and pressure over the pubes will increase the pain or tenderness there. Frequency of micturition is an invariable symptom, the frequency depending upon the degree or stage of inflammation. Hematuria is not uncommon in the early stage, and at times there appears to be little less than pure blood voided; but as the process becomes older it entirely disappears. In the acute form, the quantity of urine passed may be normal, or slightly increased, the color unchanged, and possessing feeble acid reaction. After standing a few hours it becomes alkaline, and precipitates a diffuse sediment containing mucous, pus, and blood, in greater or less amounts. Sometimes the urine becomes ammoniacal and extensively offensive. The attack is often ushered in by a chill, followed by a rise of temperature, which soon subsides, but in more severe septic or diphtheritic cases, the symptoms from the onset indicate a very grave condition. The patient falls into a typhoid state, with dry tongue, headache, vomiting, subsultus and delirium. Urination is sometimes obstructed by fragments of membrane, causing over-distention, or the ureters may be obstructed, producing total suppression and death from uræmia. In chronic cystitis, the symptoms referable to the organ itself, and its contents, are similar to those described, but of a milder type. The urine contains pus, mucous, and exfoliated epithelium in large amount. On standing, it precipitates an extremely tenacious sediment, is neutral or alkaline in reaction, and sometimes fetid. A careful examination with the endoscope will reveal the evidences of inflammation and the pathological changes present.

Treatment. Especially important is the prophylaxis of vesical inflammation. A large proportion of cases arise from the introduction of pyogenic organisms into the

bladder, hence too much care cannot be exercised in cleansing and sterilizing all instruments used for examination or treatment. The first essential is rest in bed until the acute symptoms have subsided. The diet should be unstimulating; fluid and semi-fluid foods, such as milk, eggs, and light broths, are most suitable. Saline laxatives should be administered, and care taken to keep the large intestine free from fecal accumulation. Warm vaginal douches and enemata are very soothing, and hot sitz baths, with hot local compresses, will relieve the tenesmus and vesical fulness. To allay the fever, and to render the urine unirritating when acid, the administration of the following mixture will be found useful, especially when combined with copious alkaline draughts:

R. Potass. Citrat., oz. ss;
Spts. Æther Nit., oz. i;
Tinct. Aconit., drams iss;
Aquæ ad., oz. viii. M.

Sig.—Tablespoonful in some water every four hours.

When the urine is alkaline it may be rendered acid by the administration of benzoate of ammonia, in ten grain doses, every three or four hours. Salol is particularly useful in ammoniacal decomposition, giving five to ten grains every four to six hours. The same may be said of boric acid, in ten to fifteen grain doses. To control pain, opium, belladonna, hyoscyamus, or chloral may be used with caution, and when prescribed should be given by the rectum. The first three mentioned are best administered in the form of suppositories, while chloral gives the best results when dissolved in two or three ounces of starch water, and administered as an enema. One of the most suitable preparations of opium to be given by the mouth, is Dover's powder, but bromide of soda, in twenty grain doses, and repeated every four to six hours, often acts more kindly for the relief of pain and tenesmus. Cannabis indica will often subdue the pain quite as effectually as opium, and with less injurious after effects. Irrigation

of the bladder may be resorted to when the acute symptoms have subsided, or earlier if it is of septic origin. The most useful solutions for that purpose are three per cent. boracic acid, one-tenth to one-half per cent. nitrate of silver, one-tenth to one-third per cent. permanganate of potash, one-half per cent. creolin, or one to ten thousand bichloride.

In chronic cystitis special attention must be paid to the general health, opium is to be avoided if possible, the bromides or cannabis indica being used instead to relieve tenesmus. Alkaline reaction of the urine should be corrected as in the acute stage and, if the urine be purulent, benzoic acid will be found of most service. Of the balsamic preparations there is none better than pure oil of santalwood, administered in ten minim capsules every four hours. The treatment consists mainly in local measures, in the form of vesical irrigation by means of some simple form of irrigator. The quantity to be injected at one time must depend upon the character of the solution and the degree of vesical irritability; in some cases an ounce is all that will be retained. The maximum volume should rarely exceed two to four ounces, the process being repeated several times until the bladder is thoroughly cleansed. The temperature of the fluid should be from 100° to 105° F., and the irrigating process repeated twice daily. Besides the solutions already mentioned, other remedies have been found very serviceable, such as salicylate of soda, a dram to the pint; methylene blue, one to two grains to the ounce, especially in purulent cases; ichthyol in water, one-half to one per cent., especially in gonorrhœal cystitis. In rebellious cases a two per cent. solution of resorcin may be employed. Iodoform, in the form of an emulsion (iodoform fifty parts, glycerine forty parts, mucilage of acacia ten parts), has been highly recommended, from two drams to an ounce being injected once a day. When treatment fails and the pathological

process grows worse, it may be necessary to secure constant drainage of the bladder by means of dilatation of the urethra, by the formation of a vesico-vaginal fistula, or by the use of a self-retaining catheter. The most satisfactory method for draining the bladder is by the formation of a vesico-vaginal fistula.

Emmet's operation. A sound is first passed into the bladder, and the vesico-vaginal wall steadied with a tenaculum and incised, after which a pair of blunt-pointed scissors is entered and the opening enlarged. To prevent the fistula from closing, the vesical and vaginal mucous membrane should be stitched together. Instead of the knife or scissors, the Paquelin cautery may be used.

Vesical Calculi. Stone in the bladder is a far less common affection in the female than in the male. They are oftener of the phosphatic variety, roughened areas of the bladder wall being liable to become encrusted, and serve as the starting point for calculous formation. The stone usually lies free in the cavity; rarely it is encapsuled. When suspected the diagnosis can readily be made by the sound, by a cystoscopic examination, by digital exploration through the urethra, or by conjoined abdominal and vaginal palpation.

Treatment. Calculi may be removed by way of the urethra, or by vaginal or suprapubic cystotomy. Small calculi may be removed through the urethra, after dilatation by means of slender forceps. Larger, friable stones may be crushed with a lithotrite, and the debris washed out through a urethral speculum. When cystotomy is required, the vaginal operation is generally preferred as the simplest and safest.

Foreign bodies introduced by accident, or intentionally, may be found in the urethra or bladder. The diagnosis may be made in the same way as in calculus, and their removal may be accomplished through the urethra.

Neoplasms of the female bladder are of infrequent occurrence. They include *papilloma*, *myxoma*, *fibroma*, *myoma*, *sarcoma*, *epithelioma*, and *carcinoma*. The most constant symptom of vesical neoplasm is hematuria. Growths at the vesical neck give rise to frequent and painful urination, and may interrupt the flow of urine at micturition, or cause retention. As a rule cystitis sooner or later results, followed by urethritis and pyelo-nephritis. An examination of the urine will show it to contain pus, blood, mucous, epithelial scales, neoplastic shreds and phosphates. The diagnosis is made by conjoined abdominal and vaginal manipulation, by the cystoscope, or by direct examination through a speculum.

Treatment. Many small growths which are pedunculated, may be twisted off and removed through the urethra. If the tumors be sessile and spread out over the mucous surface it is best to resort to the curette. If the hemorrhage is free, or persistent, the bladder may be irrigated with hot water, and the vagina tightly packed with gauze. If the tumor be too large for removal through the urethra, vaginal cystotomy should be performed. If the tumor be malignant, it may be curetted and lightly cauterized, which will have the effect of greatly alleviating the patient's suffering. If the urination be painful and a high grade of cystitis present, the vaginal incision should be left open to allow for free drainage.

Diseases of the ureters. The ureters are liable to ascending diseases from the bladder, to secondary involvement, or to descending diseases from the kidney, or to diseases which begins primarily in the ureter itself. One or both ureters may be affected. A serious affection of both ureters is incompatible with long life, as sooner or later secondary changes occur in the kidneys. As a result of ureteritis, of whatever form, the ureter of the affected side becomes enlarged and may be palpated through the antero-lateral wall of the vagina in its upper third, where

it gives to the finger the sensation of a rigid cord, or the feel of a round lead pencil. It is extremely sensitive upon pressure, and when so compressed produces a strong desire to urinate. An enlarged ureter can readily be felt by the rectum, from the broad ligament up as far as the pelvic brim. Further examination may be made, and much information derived, from the use of cystoscopy and the ureteral catheter and probes.

The treatment should consist in curing the cause which produces the ureteritis; co-existing cystitis should be managed in the usual way, morbid urinary conditions corrected and the urine rendered antiseptic by salol. Frequent vesical douches and high rectal enemata of warm water should be employed. With the use of Kelly's speculum the ureteral injections may be repeated, at suitable intervals, provided the operator has acquired the necessary technique for the introduction of these instruments.

CHAPTER XIX.

DISEASES OF THE UTERUS.

MALFORMATIONS.

All the important anomalies of the uterus result from arrest of development, and the nature of these anomalies depends, in a great part, upon the time at which the development was arrested. By bearing in mind the history of the normal development of the uterus, the many abnormal forms will be more readily understood. If the arrest of development occurs at a very early period, there will be simply a rudimentary bundle of muscle to indicate its situation, and in extraordinary cases there may be entire absence of the organ. If there is arrest of fusion of Muller's ducts before the twelfth week, a more or less

duplex uterus must result. If there is arrest of fusion in the two canals after the twelfth week, a bicornate or septate uterus will result. If the disturbance of development

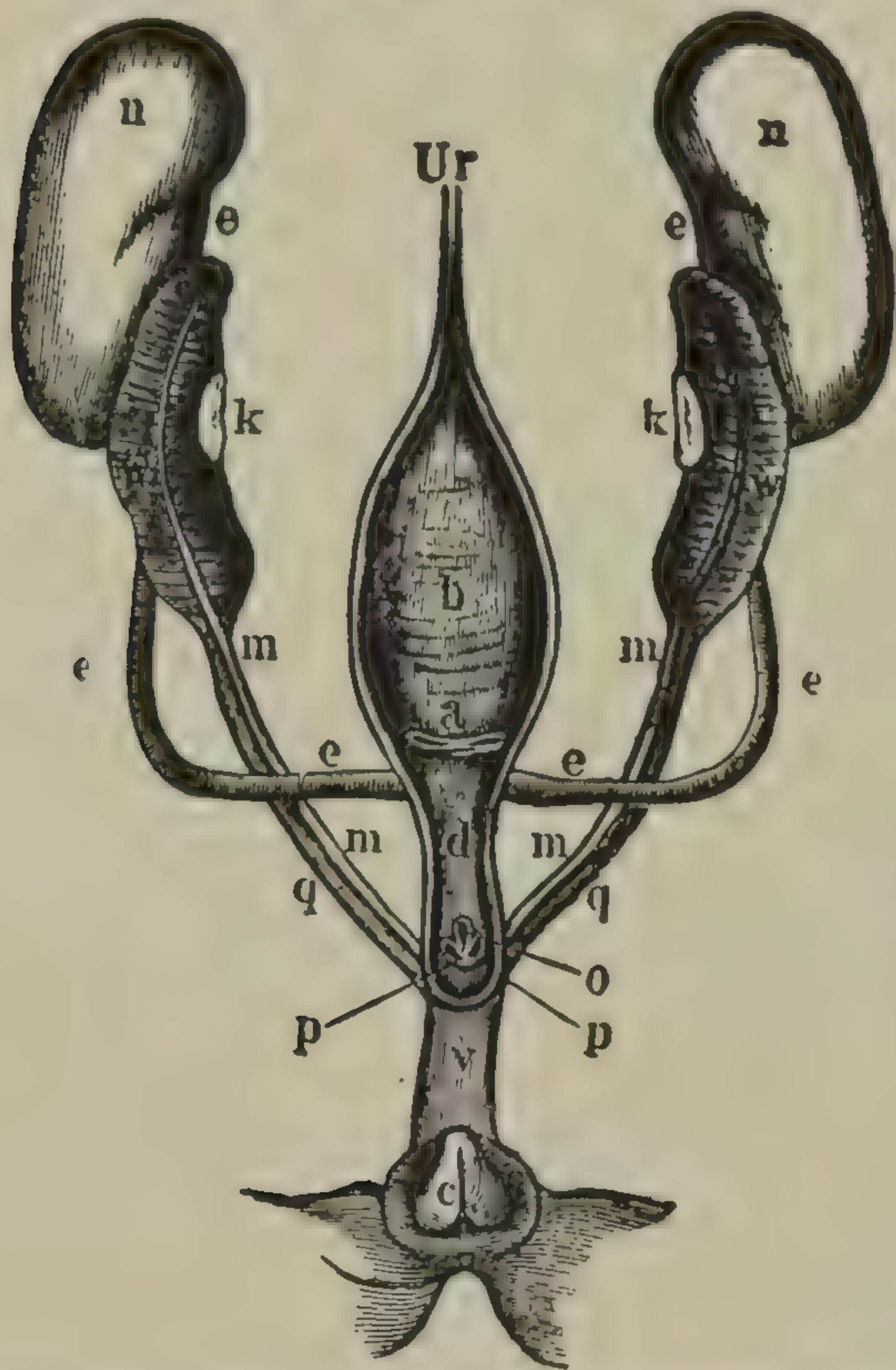


FIG. 59.—Development of the genito-urinary tract in the female.—*n, n*, kidneys; *e, e*, ureters; *a*, their orifices in the bladder; *w, w*, Wolffian bodies; *q, q*, their efferent ducts; *p, p*, their openings into the urethra; *k, k*, ovaries; *m, m*, ducts of Muller; *o*, their common orifice; *v*, uro-genital sinus; *Ur*, urachus; *c*, clitoris.

occurs at a later period, the uterus will retain a foetal or infantile form, without longitudinal separation or distinct indication of the duplex manner of its formation.

For convenience of description, malformations can thus be divided into those due to arrest of development during the first half of intra-uterine life; and those due to arrest of development after the first half of intra-uterine life.

Malformations from arrest of development during the first half of intra-uterine life. *Absence or rudimentary development of the uterus.*

Complete absence of the uterus is an extremely rare occurrence, but rudimentary development is not uncommon. There may be a small, solid, muscular body, without a cavity, or a partial excavation, or it may consist of a membranous sac. The vagina is usually absent, or consists of a shallow depression. Usually the tubes and ovaries are ill developed, and menstruation absent, but in cases where they are developed, periodical activity occurs in them, which, being unrelieved, causes much suffering.

Uterus unicornis results from an arrest of development, or from failure to appear, on the part of one of Muller's ducts. The developed side is situated entirely on one side

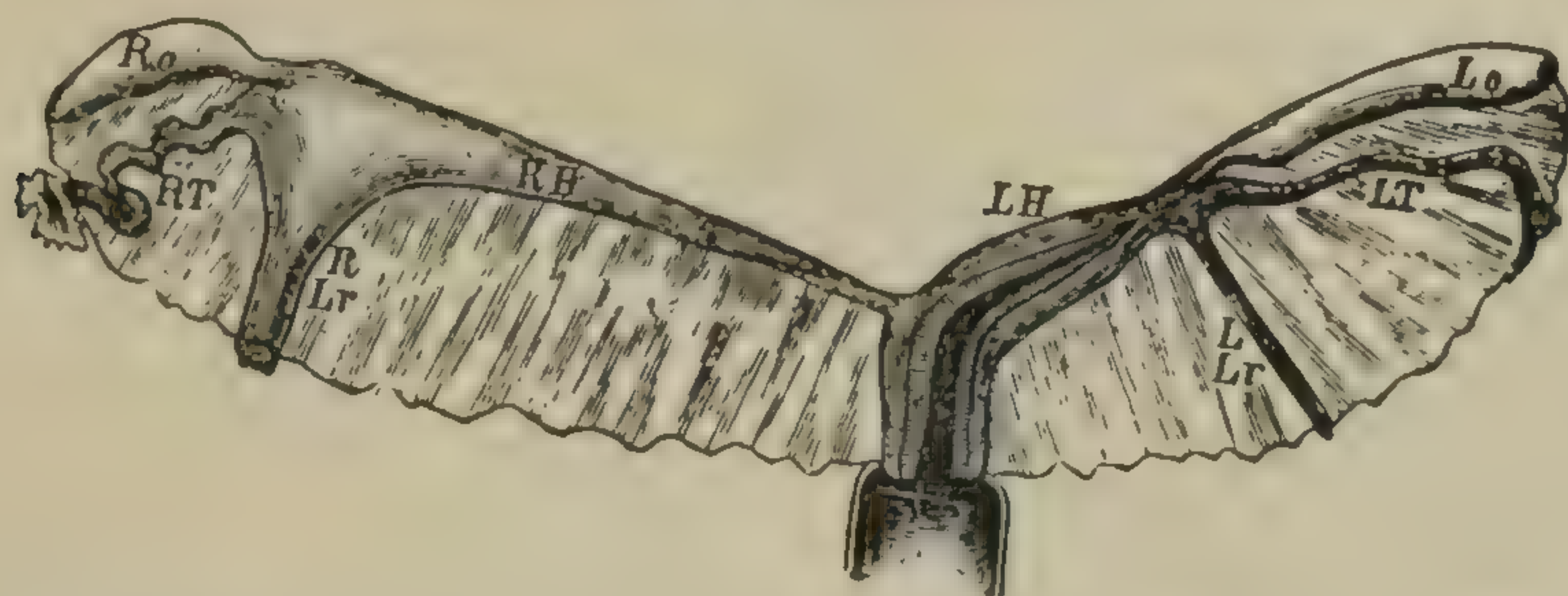


FIG. 60.—Uterus unicornis with rudimentary horn. LH, left horn; RH, right rudimentary horn; Lo, and Ro, left and right ovary; L Lr, and R Lr, left and right round ligament; LT, and RT, left and right tube.

of the axis of the pelvic cavity, and it inclines quite strongly towards the corresponding pelvic wall. There is no uterine fundus, the uterine body ending in a cone-shaped projection, in which is inserted the Fallopian tube.

Uterus bicornis and *uterus didelphys* result from the want of union of Muller's ducts immediately below those portions which normally form the Fallopian tubes. The want of union may be confined to the neighborhood of the tubes, leaving a slight depression in the fundus, or it may extend lower down, dividing a large part of the uterus.

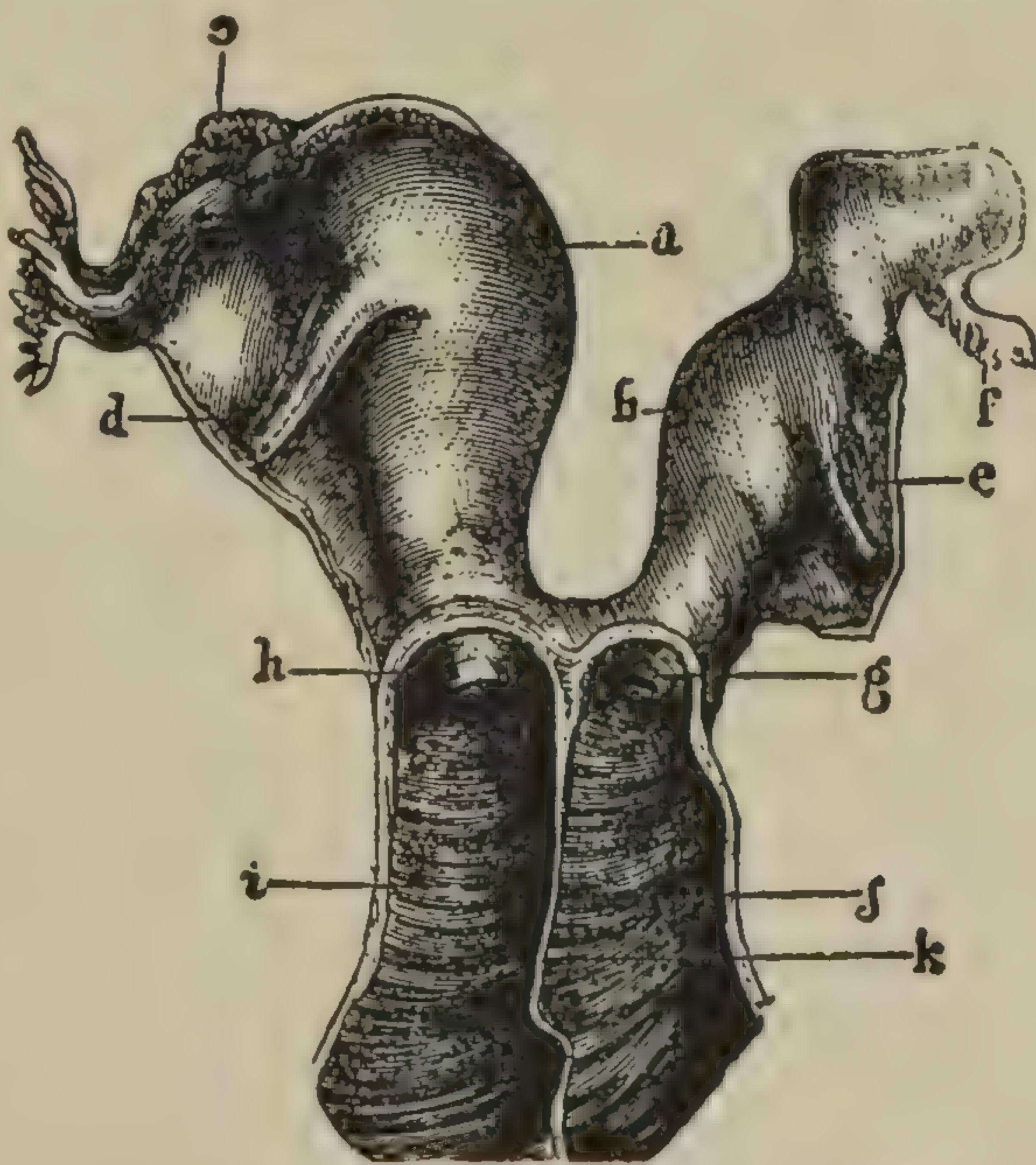


FIG. 61.—Didelphic Uterus and Divided Vagina: a, right segment; b, left segment; c, d, right ovary and round ligament; f, e, left ovary and round ligament; g, j, left cervix and vagina; k, vaginal septum; h, i, right cervix and vagina.

Uterus duplex. The double uterus results from a want of union of Muller's ducts as far as the vagina,

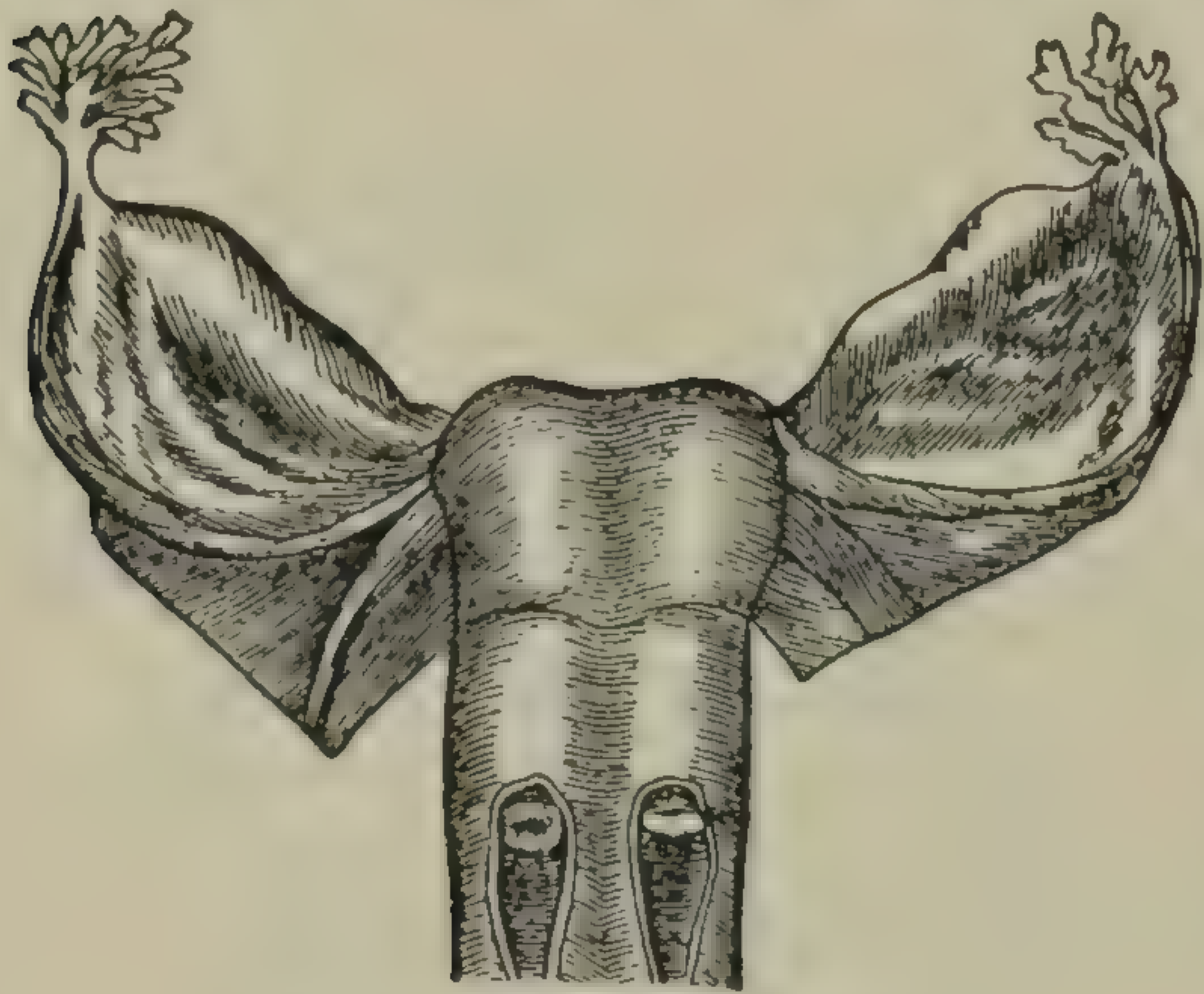


FIG. 62.—Uterus Duplex.

in consequence of which two uteri have developed. One Fallopian tube is attached to each uterus, and the vagina and cervix may, or may not be double.

Uterus septus, or two-chambered uterus, arises from an imperfect union of Muller's ducts. The uterus is of normal shape,

but the septum has not been obliterated. The vagina is apt to be similarly divided. When the septum has been partially absorbed it is called *uterus subseptus*.

The diagnosis of these deformities usually requires the aid of an anæsthetic. With the thumb in the vagina, and the finger in the rectum, the structures between them may be palpated, especially if the uterus is drawn down with a vulsellum, toward the vaginal outlet. A sound introduced into the uterine cavity will also aid materially in arriving at a correct conclusion. In such cases treatment is of no avail, except as far as relieving painful or distressing symptoms. Where there is absence or rudimentary development of the uterus, removal of the ovaries may be demanded in order to secure relief.

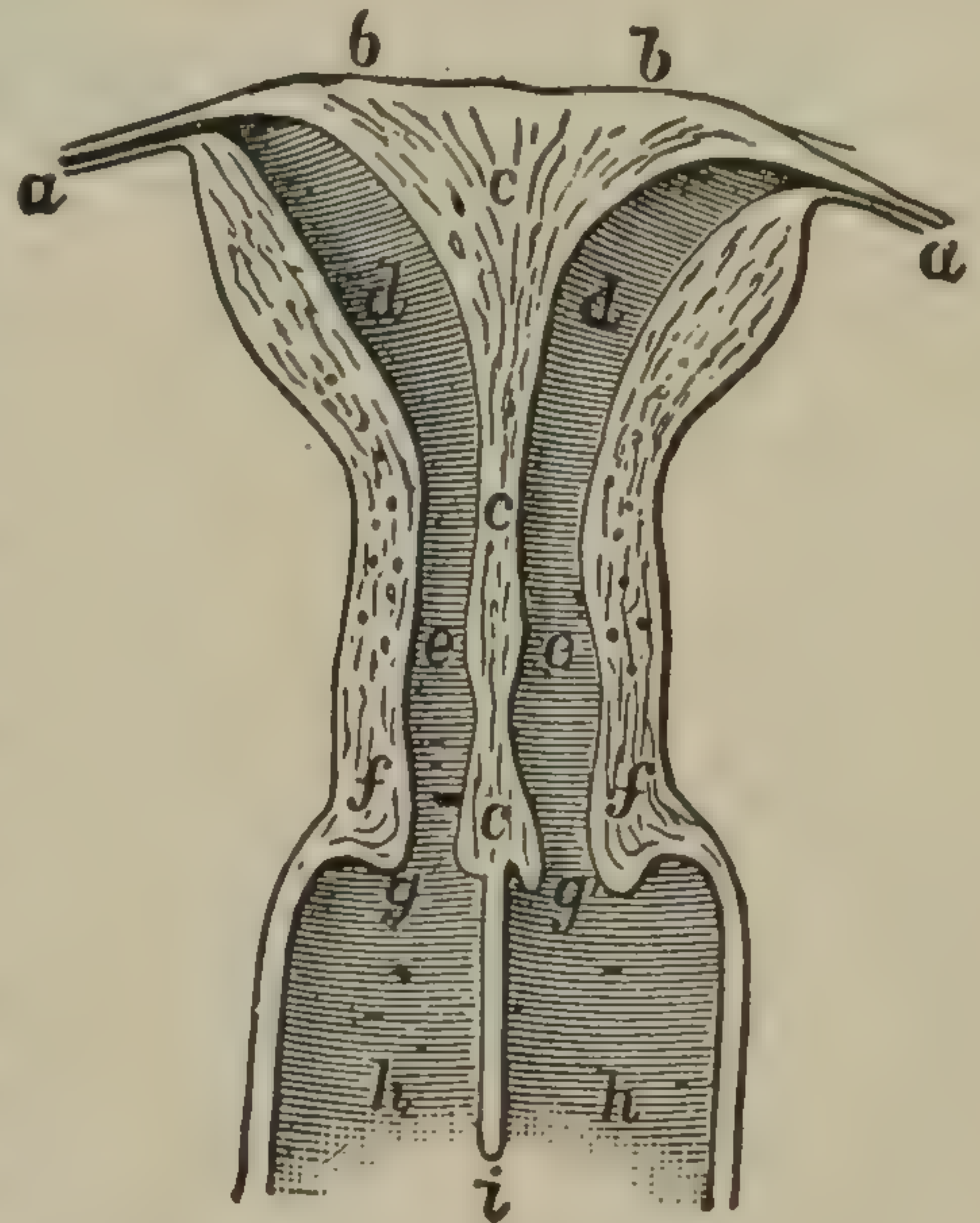


FIG. 63.—Two-chambered uterus.

Atresia uteri. Just as has been shown that the hymen or vagina may be closed, the uterine canal itself, although more rarely, may be the site of atresia. The mucous membrane of the vagina may cover the whole vaginal portion, without forming any external os, or the cervix may form one uninterrupted muscular mass without bore. In such cases the vaginal portion may be well developed, or totally absent. In a bicornate uterus, one horn may be closed. Whenever the genital canal is closed, the symptoms due to retention, such as amenorrhœa, painful menstrual disturbances, and the formation of a tumor will be present, hence the remarks made upon the symptoms, diagnosis, and treatment of atresia of the hymen and vagina are applicable to atresia uteri. When the atresia is situated in the uterus, however, the vagina can be exposed to its full extent and, in so doing, the uterus will be found to form a round elastic tumor above it.

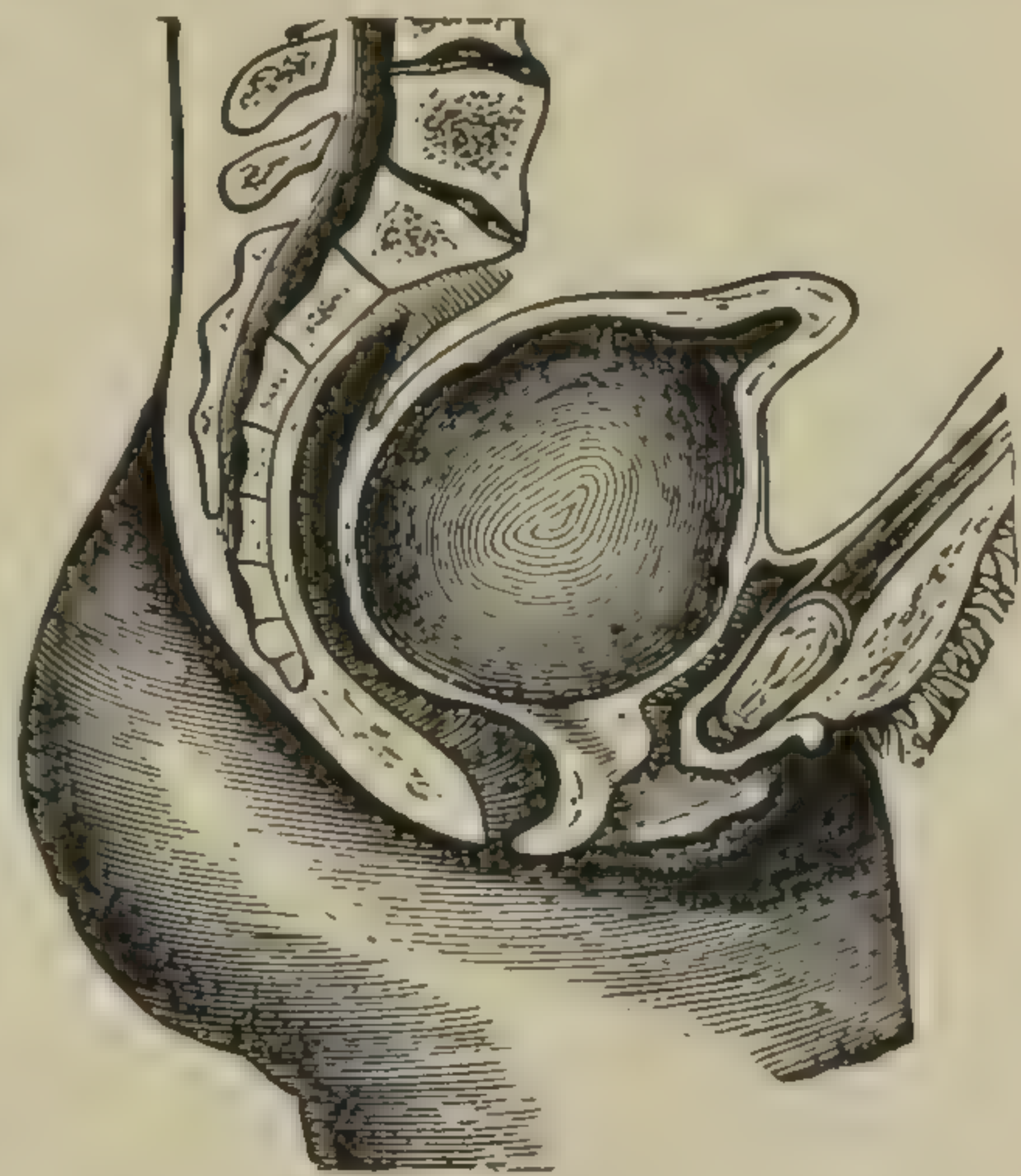


FIG. 64.—Atresia of the cervix uteri.

Diagnosis. In pregnancy there will probably be a history of menstruation, and there will be present some of the well known signs. A fibroid forms a hard, nodular tumor, and often causes menorrhagia. Hematocele appears suddenly, forms a broader mass, which pushes the uterus forward, and with these there will be a history, possibly, of previous menstruation. If the uterus is double the atresia is found much more frequently on the right side. In such cases the tumor will form in one uterus, while the other may perform the menstrual function quite normally.

Treatment. If the uterus is single, an opening should be made through the cervix with a trocar, or blunt-pointed

forceps, and enlarged if necessary, and the contents evacuated with the same care as already described when speaking of the treatment of atresia of the hymen, after which the uterine cavity must be irrigated with an anti-septic solution, and some strips of iodoform gauze loosely inserted, and brought out through the new formed os. Later on the interior of the uterus may be curetted to combat endometritis and to hasten involution.

If the accumulation is found in one half of a double uterus it is still an advantage to enter, if possible, through the cervix; but often there is no choice, and the tumor must be punctured at its lowest point in the vagina. If the swelling cannot be reached from the vagina, cœliotomy should be performed, and the affected horn or whole uterus removed.

Arrest of development during the second half of intra-uterine life. *Fetal and infantile uterus.* Some adult women have a uterus which corresponds in size to the uterus of a fœtus toward the end of pregnancy, or that of a young child. Other organs may be normal, but often the condition is combined with other abnormalities, especially of the ovaries.

Pubescent or congenitally atrophic uterus is one characterized by its small weight, often not exceeding an ounce, but the cervix and body have about the same length. Sometimes the body of the uterus is well developed, but the cervix is small, pointed, or conical. In exceptional instances, the whole vaginal portion may be lacking, while the rest of the vaginal apparatus is well developed. In these cases the vagina passes directly into the uterine cavity by a small constricted canal. Ante flexion of the uterus is often congenital, and simply a continuation of the shape of the uterus found in the fœtus and in young children. The uterus may congenitally bend to one side, the two Mullerian ducts not having kept pace with one another.

CHAPTER XX.

DISEASES OF THE UTERUS CONTINUED.

INJURIES.

On account of its position, the unimpregnated uterus is little exposed to injuries from without, but is frequently the seat of injuries produced through the vagina. In gynecological operations the uterus is occasionally wounded. Some uteri are so soft that they are easily penetrated by the sound or dull wire curette. When strict antiseptic precaution have been observed, and injection of an irritating fluid omitted, no evil consequence will probably follow a small puncture of the uterus. If there is prolapse of the intestine, cœliotomy should be performed, the intestine drawn up and the opening closed in the uterus.

Laceration of the cervix. By far the most common injury to the uterus is that sustained by the cervix during child-birth, when it may be ruptured, or lacerated. The important pathological bearings of this accident upon disorders of the uterus have been appreciated only of late years. The credit of having recognised the significance of the lesion, and of having furnished a safe and efficient means for cure, belong to Dr. T. A. Emmet.



FIG. 65.—Unilateral laceration of the cervix.

Causes. The rapid forcing of the presenting part of the child through an imperfectly dilated cervix, brought about by early rupture of the membranes, or unusually severe and protracted expulsive efforts, is the cause, in a large proportion of instances, of laceration. More or less important parts in the causation of this injury are played

by rigidity, faulty development, cystic disease, cicatricial induration, and hyperplasia of the cervix. The unskilled use of obstetric forceps may also be a cause of the accident.

Lacerations are called *partial* when the tear in the canal does not reach the mucous membrane of the vagina; *complete*, when the whole thickness of the cervix is torn. Complete laceration may be *unilateral*, *bilateral*, or *stellate*.

Bilateral lacerations are by far the most common, and they almost always extend from side to side, rarely from before backward.

Unilateral lacerations may occur in any part of the cervix, but are more common on the left side, owing, it is said, to the frequency of the first position of the vertex.



FIG. 66.—Bilateral laceration of the cervix, with eversion of the cervical mucous membrane.

Stellate lacerations, while sometimes not deep, are often of considerable extent. In regard to frequency, it may be said that but few women confined at full term escape without sustaining some injury to the cervix,

be it ever so slight, but the proportion of rents likely to produce pathological symptoms, may be put down as somewhat less than fifty per cent.

After laceration, the torn surfaces, bathed in the lochia, rarely unite, and in that condition will act as a source of irritation, prevent proper involution of the uterus, and will eventually induce enlargement and thickening of the uterine tissues. In some cases the flaps become enormously hypertrophied by the formation of new connective tissue, so as to resemble small fibroid tumors, and have been mistaken for such. Relaxed ligaments with uterine displacement—especially when it is associated with a lacerated perineum—and congested ovaries and tubes, in

their turn, follow. Occasionally nature seems to make an effort to repair the laceration by the formation of a large amount of granulation tissue filling up the angles of the rent. In process of time this granulation tissue becomes converted into a hard dense cicatrix, compressing terminal nerve filaments, a condition thought by many to be the cause of the reflex symptoms so commonly met with in long standing cases. When the lacerated cervix does not cicatrize, the separated lips evert, the mucous membrane lining the cavity is rolled out (ectropion), its epithelium is gradually rubbed off, and a hyperplasia of cysts and papillæ take place, giving rise to a profuse, discolored, glairy discharge. This hyperæmic and hyperlastic condition often extends upward to, and often beyond the internal os, and cervical and corporeal endometritis result, so that menorrhagia may be present. Attention has been called to the frequency with which epithelioma of the cervix has been found in conjunction with laceration, and it is undoubtedly a fact that a very large proportion of such cases are preceded by such traumatism.

Symptoms. The symptoms which attract the attention of the patient will probably be a dull pain in the back, sacrum, and lumbar regions; bearing down or dragging in the pelvis; pain in the ovarian regions, hips and thighs; leucorrhœa; menorrhagia; and occasionally sterility, or habitual miscarriages. Accompanying these there will generally be found progressive loss of health, and a most decided state of anæmia. Neuroses of the eyes, head, stomach, and bowels are also frequently met with; to



FIG. 67.—Multiple stellate laceration of cervix.

which hysterical symptoms may even be added. On passing the finger into the vagina, the laceration is easily recognized. In the angles of the rent hardened tissue is felt, pressure upon which produces pain, which often radiates into the pelvis and down the thighs. The surface may feel rough and granular from the large follicles, or velvety and soft from erosion. Examination by speculum does not give much information, further than to bring into view the granular or eroded surface, the white or yellowish discharge with which it is covered, and the hypertrophied condition of the cervical flaps.

Indications for trachelorrhaphy. The mere existence of a laceration does not call for radical operation. The indications for that measure depend entirely upon the depth of the rent, the degree of eversion and amount of erosion and hyperplasia of the torn lips; the intensity of the symptoms depending upon it, and by the improbability of these symptoms being permanently cured by other than radical treatment. The treatment of laceration immediately after their occurrence has been strongly advocated by some, but such a procedure has not gained in favor with the majority of obstetricians, owing to the difficulty in estimating the extent of laceration, the relation of the parts, and the ability to bring them together properly.

Preliminary treatment. Some have thought it advisable to cure erosion, when present, before operating, but such a procedure does not seem necessary. If there is extensive cystic degeneration, it may be treated for a time by local applications, but generally both these conditions can be managed at the time of operation. Preparatory curettage of the uterine cavity has also been advised when endometritis exists, but this too is unnecessary as it can be done just as effectually before beginning the denuding process.

The operation of trachelorrhaphy may be performed by placing the patient in the dorsal position, the legs

elevated, and kept in position by Clover's crutch, and a Sims' broad-bladed speculum inserted. A very convenient speculum for that and other operations on the uterus, when the patient is in the dorsal position, is one known as Edebohl's. It is so curved at the junction of the handle and the blade that it will not slip out, and, by suspending a sufficient weight to the handle, the necessary retraction is made on the perineum, and the necessity for an assistant to hold the speculum done away with. Some prefer operating in Sims' position, claiming that it gives much more room for manipulation and for the passage of the needles. However the choice of position and speculum is largely a matter of education and habit. The best needles to employ are heavy triangular or bayonet-pointed, straight, or curved slightly at the point (Emmet's). The suture material is a matter of indifference; silver wire, silkworm, silk



FIG. 68.—Edebohl's speculum.

and catgut are all used. If the perineum is to be closed at the same time, it is best to use some material which will be absorbed in the course of eight or ten days, such as chromic catgut. Unless contraindicated from some good cause, it would be preferable to use catgut under all circumstances, as most patients have a great dread of what they look upon as another operation for the removal of the stitches.

After deciding upon the amount of denudation necessary, the edge of one lip is seized with a tenaculum, and a flap raised from the surrounding tissue with scissors or scalpel, the cutting process being continued until the angle is reached, where it may be necessary to go quite deeply to remove all the cicatricial tissue. After the angle has been passed, denudation is made in a similar manner on the other lip, and completed by uniting it with

the previous incision. If a second laceration exists on the opposite side, it is to be denuded in the same way. Some use a peculiar pair of scissors devised by Skene and known as "hawk-bill" scissors, which denude the margins and take out the cicatrix at one and the same time. Hemorrhage can usually be controlled by hot water, but if very troublesome a stitch may at once be passed through both lips of the cervix, above the angle, and tied so as to compress the circular artery. The sutures are next introduced, the first being passed through the upper angle of the rent, and each successive one through the whole depth of each



FIG. 69.—Surfaces denuded and sutures passed.

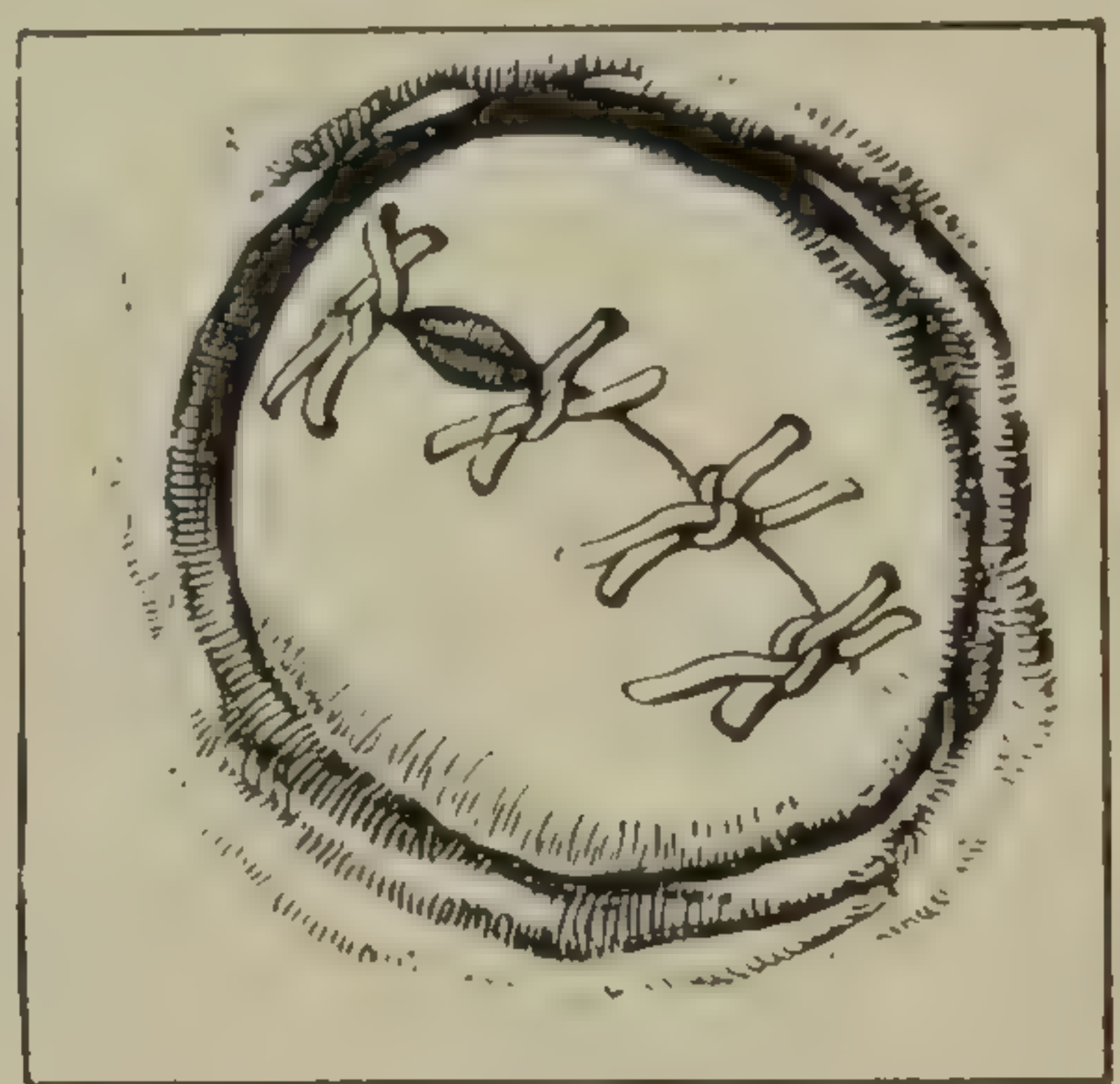


FIG. 70—Same with sutures tied.

lip, until all the sutures needed for that side have been inserted. Next the sutures on the opposite side are similarly inserted, if the denudation has been bilateral, after which they are tied, the highest one first. A sound is next introduced into the cervix, to make sure that it is sufficiently patulous. After flushing and drying the vagina, it may be lightly packed with strips of iodoform gauze.

CHAPTER XXI.

DISEASES OF THE UTERUS CONTINUED.

METRITIS.

According to the etymology of the word, metritis means inflammation of the uterus, but the classification of the various pathological conditions included under that heading is not so easily disposed of. When considered according to the progress of the disease, it is designated by the terms *acute* and *chronic*; when classified according to location, it is divided into *cervical* and *corporeal*; when looked at from an etiological standpoint, it is designated by the terms *puerperal*, *post-puerperal*, *gonorrhæal*, *erythematous*, and *traumatic*; or when from a pathological standpoint, *granular*, *fungous*, and *ulcerating*.

For convenience of description the various forms of endometritis may be classified as follows:

1. Acute metritis and acute endometritis.
2. Chronic cervical endometritis.
3. Chronic corporeal endometritis.
4. Chronic metritis, or subinvolution and sclerosis.

ACUTE ENDOMETRITIS AND ACUTE METRITIS.

By the term **acute endometritis** is meant acute inflammation of the endometrium, and by the term **acute metritis**, inflammation of the walls of the uterus, but as inflammation of the endometrium can scarcely occur without the uterine walls participating to some extent, nor can inflammation of the walls occur without participation of the mucosa, the description of the two, as distinct diseases, would be useless, at least from any other than a pathological standpoint. When the inflammation affects the mucous membrane more than the walls, it is termed endometritis; when it produces extensive changes in the walls, it is called metritis.

Causes. The most potent cause arises from bacterial invasion from infected hands and instruments during parturition, abortions, operations and examinations; during uterine and vaginal douches; from retained decidua after abortion; or from invasion of the gonococcus. Infection may arise secondarily from foreign bodies left in the uterus or vagina, such as stem pessaries, tents and tampons. Violent congestion of the uterus, such as occurs in acute suppression of menstruation, and the prolonged congestions growing out of flexions and versions, are prominent factors in these lesions. Retained menses, arising from stenosis, catching cold, and other influences, such as over-exertion, excessive coitus, or traumatism, acting during the menstrual congestion, increase the natural hyperæmic condition to such an extent as to interfere with its natural subsidence, and tend to engorgement and inflammation. Specific germs of the exanthemata appear to be capable of inducing mild inflammatory changes upon the mucous membrane of the entire uterus, seeming to act upon it as upon other mucous tracts (the conjunctivæ for instance during measles), and in a similar manner tend to disappear with the subsidence of the disease.

Pathology. In acute endometritis the extent of the lesion will depend upon the virulence and activity of the infecting element, and will vary from a mild injection of the endometrium to a deep and wide spread infiltration with the products of inflammation. The material found bathing the infected surfaces will also depend upon the same influence, being in mild cases merely a mucopurulent fluid, in others purulent, or even bloody. The normal red color of the endometrium is deepened proportionately, and may be almost livid; the mucous membrane is thickened, softened, even pulpy at times, and easily torn from its attachments. The interglandular spaces show an increase of round cells, which, in extreme cases, are so abundant as to give the whole surface the appearance of

granulation tissue. The epithelium is infiltrated, and even destroyed in certain places, and the cilia in general may be said to have shared a like fate. The implication of the muscular coat (metritis) is slight, except in some cases of gonorrhœal infection. There is swelling of the muscular fibres, increase of cell formation in the interspaces, and infiltration with a serous or sero-purulent fluid, by which the uterus becomes more or less enlarged. Minute extravasations of blood are apt to be found in spots, particularly near the mucous membrane.

Symptoms. In the simple form they may be comparatively insignificant. There will be a sense of fulness in the pelvis, more or less pronounced, if there be arrest of the menstrual flow, accompanied by frequent micturition and rectal tenesmus. In more severe cases the symptoms are more decided. There will be dull deep seated pelvic pain, backache, and aching down the thighs, increased by motion or by the evacuation of the bladder and bowels. Slight febrile reaction will also be present. In septic cases a chill, more or less pronounced, ushers in the general disturbance, accompanied by a rapid and decided rise of temperature. Should the inflammation extend to the peritoneal covering (perimetritis), the phenomena of local peritonitis will be directly added; if it extend through the Fallopian tubes the evidence of salpingitis will appear. and from either of these general peritonitis may arise, or other extreme symptoms indicative of general septic absorption.

The chief physical signs are tenderness over the pubes, and tenderness of the uterus, elicited by bimanual and vaginal pressure. The cervix will be found patulous, softer, larger, and redder than natural, particularly about the external os, and exuding from it a tough, glairy, opaque secretion. When the uterine walls are affected, particularly in septic inflammation, the entire organ is enlarged and softened, and there will be noticed flowing

from the os a thick, ichorous, bloody discharge, which may have the odor of decomposition.

Prognosis. In the simple form life is rarely endangered, but in the septic forms it commonly is, either through general peritonitis, or from general septic infection. The integrity of the organ is always endangered to an extent proportionate to the severity of the inflammation; slight, if any, in the milder forms, but decidedly pronounced in the graver ones. The dangers result in part from the chronic changes in the uterus itself, and in part from the implication of the adnexa.

Diagnosis. In the non-pregnant uterus this lesion is indicated by tenderness of the organ, and by discharge from the cervix, taken in conjunction with the comparative suddenness of an attack developed in connection with an acute suppression of menstruation, with a prior vaginitis, or with some such cause as an operation upon the cervix, or the introduction of a sound. After abortion or labor it is commonly indicated by a chill, followed by rise of temperature, and temporary arrest of the lochia, with its subsequent reappearance, and on reappearance often has an odor of decomposition. The organ soon becomes tender and subsequently loses its firmness. Such cases may be confounded with typhoid or malarial fevers. If malarial, quinine will control it absolutely; if typhoid, differences in the rise and fall of temperature will assist in making a diagnosis. In all cases when in doubt, it is wiser to assume the presence of septic infection. Localized mastitis is another source of error, but a careful examination of the breasts will readily correct that.

Treatment. From what has been said of the etiology of the disease, it will be readily understood that the treatment will vary according to the nature of the case. The milder forms are best treated by rest in bed, purgations by means of salines, by mild febrifuge treatment, and by hot vaginal douches supplemented by hot fomentations,

and counter irritation over the abdomen. If there is no serious objection to physical examination, local depletion may be accomplished by free scarification of the cervix, followed by a warm vaginal douche. As soon as the more acute symptoms have subsided, boro-glyceride tampons may be placed against the cervix daily. When it arises as a result of vaginitis, particularly that form met with in gonorrhœal infection, it will probably be necessary to irrigate the uterine cavity with a solution of bichloride (1 to 3000), dilating the cervix sufficiently for that purpose, if it is not already patulous. In the septic forms prompt and energetic measures are demanded. If the result of negligence in failing to keep up proper aseptic precautions during operations or examinations, the cavity of the uterus should be freely irrigated with bichloride solution and packed with iodoform gauze. Should a wound exist, the lips had better be separated and kept apart by strips of the same material. Should the case be one of septic inflammation following abortion or labor, radical surgical measures should be promptly applied. The cavity of the uterus should be curetted, all debris scraped away, and the uterus fully and firmly packed with gauze. The vagina must then be packed loosely, first around the cervix and then down to the introitus. The packing of the vagina should be removed at the end of twenty four hours and warm sterile douches given. At the end of forty eight hours the uterine packing may be removed and, if no fever be present, the cavity of the uterus need not again be entered, but if the temperature is still elevated the cavity should be irrigated and fresh gauze inserted. Even though the case appears desperate, the cleansing and draining should be continued, for not unfrequently it yields in the end. The gravest surgical perplexity arises in connection with further operative procedure. The removal of the infected uterus, either through the vagina or by cœliotomy, offers the surest

relief. could the shock of so grave an operation be controlled. Patients infected with a general sepsis rarely withstand any grave abdominal, or even pelvic operation, and although many successful cases have been reported, it is still looked upon by many as justifiable only under desperate conditions.

Stimulated by the success of serum therapy in diphtheria and in a few other infectious diseases, effort has recently been made to procure a serum that will be antagonistic to streptococci and antidotal to the products of their activity. This form of medication bids fair, thus far, to be of great service in puerperal infection. Few reports have yet been published regarding the use of the serum antitoxine, but those that have been, serve to prove that in cases of infection due to poisoning by the streptococcus alone, the streptococci antitoxine, when used early, is a curative agent of great value, but in mild cases of infection in which, besides the streptococcus, the colon bacillus, the bacillus fetidus, the staphylococcus, the bacillus pyocyaneus, and other micro-organisms are found, this antitoxine has little or no beneficial effects.

ENDOCERVICITIS.

Endocervicitis is recognized by various synonyms, such as cervical endometritis, cervicitis, cervical catarrh, trachelitis, and erosion of the cervix. Inflammation of the cervix exists independently of like lesions in the body of the uterus, its position exposing it to disease to a far greater extent than the deeper portions of the organ, and as such requires separate consideration. In acute processes, especially those derived from gonorrhœa and septic infection, the two parts of the organ are so often involved together, that it seems unnecessary to consider the lesions of the two separately. The appearance presented by the cervix in acute inflammation has already been referred to. The mucous membrane of the canal is

swollen and softened, and its cavity filled with a viscid muco-purulent secretion. The appearance presented by the deeper portion of the cervix is also, in all respects, similar to that met with in the body of the uterus. This does not apply, however, to the chronic forms of the disease; the inflammation being of a lower grade of intensity, more strictly confines itself to the cervix, without involving the deeper parts of the uterus.

Causes. Chronic endometritis may arise from a variety of causes. Impoverishment of the blood from chlorosis or some other form of malnutrition, producing lowered vitality, strongly predisposes to the disease. Infection from the vagina, such as from gonorrhœal or purulent vaginitis, from the entrance of foreign bodies or septic germs into the vagina, from examinations, operations, coitus, masturbation, pessaries, and vaginal douches, may infect the cervix directly. Laceration of the cervix is by far the most frequent cause, and along with it may be mentioned displacements of the uterus, operations upon the cervix, strong local treatment, and attempts at abortion.

Pathology. Endocervicitis is characterized by hyperæmia, thickening of the cervical mucous membrane, and hypersecretion of the glands. The mucous may be unaltered, or it may be thicker than normal and excessive in quantity. If the congestion is long continued, exfoliation of the epithelium progresses faster than its replacement by the development of new cells, so that the membrane becomes covered with young epithelium, giving it a reddish color (*simple erosion*). This disturbance not only involves the mucous membrane of the canal, but extends outward from the os, about half the thickness of the walls of the cervix, giving rise to the condition once described as ulceration. As the process advances the mucous membrane becomes thickened by proliferation of the areolar tissue, so that it becomes too large for the surface which it covers, and is

thus thrown into a multitude of minute folds, rugosities or wrinkles. To this condition the name *papillary erosion* has been given, as the small folds look like papillæ. The glandular pockets formed by these folds reach down to and between some of the bundles of muscular fibres. These pockets, as well as mouths of the glands, may become closed and filled with secretion, forming cysts of all sizes up to that of a pea, and give rise to that condition called *follicular erosion*. When the hyperplasia is extensive, the thickened mucous membrane

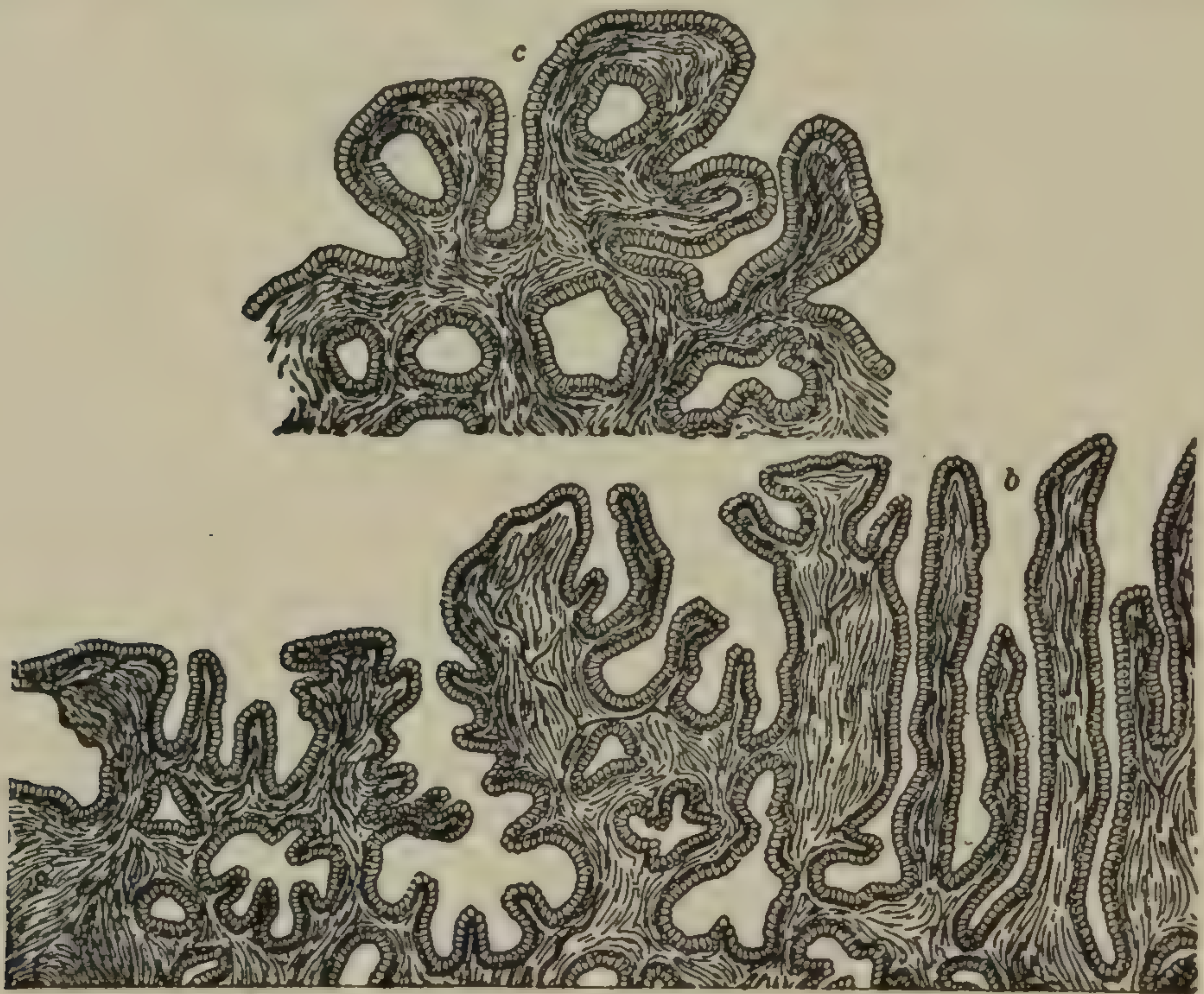


FIG. 71.—Erosion of the cervix,—*a*, *b*, simple papillary erosion ; *c*, follicular slightly enlarged.

overfills the cervical cavity, dilates the external os and rolls out into view, giving the cervix the appearance as if the vaginal portion were partly clothed with cylindrical epithelium. This condition is called *eversion* or *ectropion*. When the structures are more actively affected, or to a greater depth, other changes are produced. The mucous membrane throws out large projecting folds which may or

may not develop into mucous polypi or polypoid masses. The occluded and cystic pockets and Nabothian glands may project on the surface, and, if numerous, may occupy half the thickness of the cervical walls, and produce a condition known as *cystic degeneration*. As a result of these changes all of the glandular structure may be finally destroyed, and sclerosis, resembling senile atrophy, result.

Symptoms. When mild, and of short duration, the case may be free from all symptoms except a vaginal discharge. This discharge, however, is in some degree characteristic; it is not continuous, nor, in the absence of vaginal implications, abundant. It is viscid and jelly-like, and transparent, opaque, or yellowish according to the amount of purulent admixture. In the presence of cervical laceration, it is mixed with a more muco-purulent discharge, and is at the same time more constant. In deeper seated implication of the cervix there will be, in addition to the discharge, dull lumbo-sacral pain, and, perhaps, reflex nervous symptoms. On making a digital examination, a softened ring is felt around the os, and, if extensive cystic degeneration with eversion exists, the cervix will be felt enlarged, soft, and elastic, with perhaps isolated distended follicles, like buried shot under the surface.

Laceration of the cervix, with extensive erosion, may simulate carcinoma, but by examining under the microscope a small strip removed by the knife, it can be readily differentiated. A profuse serous and blood-stained leucorrhœa is almost always characteristic of cervical carcinoma, and so are the hard exuberant cauliflower excrescences springing from the vaginal aspect of the everted cervix.

Treatment. As the disease consists mostly of an inflammatory degeneration of the cervical mucous membrane, efforts should be directed to produce an alterative influence upon that membrane; and as it is often associated

with a depraved condition of the system, further efforts must be made to affect favorably the general health. Every function of the body should be regulated by proper means, and vegetable tonics, mineral acids, and preparations of iron administered, and daily exercise and good healthy nourishing food provided for. Particular attention should be paid to the proper regulation of the bowels, for which a ferrugineous tonic with a cathartic may be prescribed, as in the following:—

R. Magnesiæ Sulphatis, oz. ii ;
 Ferri Sulphatis, grs. xvi ;
 Acid Sulphuric, dil., dram i ;
 Tinct. Gent. Co., oz. i ;
 Elixir Simplicis, ad., oz. xvi. M.

Sig.—Two tablespoonsful in half a tumbler of ice water each morning.

R. Sodæ et Potass. Tart., oz. ii ;
 Vini ferri amari, U.S.D. oz. ii ;
 Acid Tartaric, drams iii ;
 Elixir Simplicis, oz. iv ;
 Aquæ ad., oz. xvi. M.

Sig.—Two tablespoonsful in half a tumbler of water each morning on rising.

Locally the source of irritation must be removed, and the effects counteracted by mild antiseptic and astringent applications. Endometritis and vaginitis, if present, should be treated, and uterine displacements corrected. Of local applications, the most important is the vaginal douche. The water may contain permanganate of potash (1 to 3000), carbolic acid (1 to 100), or bichloride (1 to 5000), when for antiseptic purposes; and if required for an astringent effect, sulphate of zinc, three grains to the ounce, sulphate of copper, two grains to the ounce, or acetate of lead, five grains to the ounce. Vaginal tampons, saturated with boro-glyceride, or glycerite of tannin, or a ten per cent. solution of ichthyol, may be introduced by the patient every night, and removed the next morning before taking the douche.

Local applications, such as a ten per cent. solution of sulphate of copper, or crude pyroligneous acid, may be

made through a speculum, twice or three times weekly. In some cases the application, once in a week or ten days, of strong carbolic acid, or tincture of iodine, or of the two mixed in equal parts, seems serviceable, followed at once by the application of a boro-glyceride tampon. In all cases the os should be well dilated, the mucous wiped away, and the application made freely to the entire cervical cavity and to the vaginal portion, by means of an applicator, or by forceps wrapped with cotton. When the cervix is much indurated and studded with retention cysts, scarification is very useful. It acts by depletion and allows the escape of the inspissated mucous. The puncture should be permitted to bleed a little, but if the hemorrhage is too free it may be checked by absorbent cotton firmly pressed against the cervix. Subsequently tincture of iodine, or carbolic acid, should be applied, and a small boro-glyceride or ichthyol tampon placed under the cervix to maintain the antiseptic and alterative action.

In cystic degeneration, the cysts must be laid open, and carbolic acid or tincture of iodine applied. In very chronic cases, where there is extensive degeneration of the mucous membrane, it has been recommended to destroy it by means of strong caustics or escharotics, but their use is dangerous, it being impossible at times to limit their action, and, besides, they are likely to produce cicatricial contraction. When glandular tissue is to be destroyed, the most efficient way of doing so is by excision of the mucous membrane, after the manner recommended by Schroeder.

CHRONIC CORPOREAL ENDOMETRITIS.

Like the cervix, the body of the uterus is liable to chronic inflammation of its lining mucous membrane.

Causes. It may follow at once upon an attack of acute endometritis, or metritis; or it may be brought about by causes which delay or disturb involution after abortion

or labor; by disturbed menstruation often repeated, especially when complicated with stenosis of the cervix, ovaritis, and such like; by mechanical interference with the uterine circulation, arising as a result of such conditions as uterine displacements, pelvic tumors, exudates, or other morbid processes in or about the pelvis; by direct infection, either by means of the hands, instruments, or foreign bodies, or by ascending septic inflammation of the vulva or vagina. Anæmia and debility are believed to be predisposing causes at least. In such, the flow being irregular, and often scant, the uterine hyperæmia is insufficiently relieved each month, and hyperplasia of the endometrium results.

Pathology. To the naked eye the mucous membrane is swollen and soft. In color it resembles quince jelly, with here and there lighter areas, and again spots even darker. It is much thicker than normal, easily stripped from its attachments, after which it is seen that the muscular coat participates in the congestion. The surface of the mucous membrane is irregular, presenting alternate projections and depressions. These projections or fungosities may be quite large, of a round and elongated form, or they may be veritable polypi, sessile or pedunculated. In other cases small cysts, resembling somewhat similar bodies met with in the cervix, are present. When atrophy of the mucous membrane has resulted, the surface is smooth and glistening, and when there are extensive atrophic changes, is thin and transparent.

Microscopically corporeal endometritis presents in three forms which may appear separately, or be combined in one and the same patient. They are the *interstitial*, the *glandular*, and the *polypoid*.

In the *interstitial* form the interglandular tissue is transformed into cicatricial tissue which compresses the glands, causing their partial and sometimes complete obliteration. In other places they are converted into

cysts, in number proportionate to the degree of connective tissue development. In extreme cases, of long duration, the mucous membrane becomes atrophied, and is converted into a thin layer of sclerosed connective tissue. Embedded in this sclerotic tissue, here and there are cyst cavities, the remains of constricted and degenerated glands.

There are two forms of the *glandular* variety, one in which the glands are increased in their dimensions (*hypertrophic*); and another in which there is actual increase in the quantity of gland tissue (*hyperplastic*). In the former, the utricular glands no longer appear as a series of straight tubes, but are twisted, elongated and arranged spirally. In the second form there is not only increase in the number of the glands, but they are distorted, and here and there present lateral prolongations or diverticulæ.

Chronic *polypoid* endometritis is a combination of the interstitial and glandular varieties, with marked cystic formation, together with great increase of the vessels, both in number and in dimensions, and an increase of the interglandular structure. In some cases the whole mucous membrane is thickened, in others only portions, while in others the glands are chiefly affected and project as polypoid masses. The great increase in vascularity accounts for the clinical behaviour of this variety, menorrhagia being the striking symptomatic feature. In connection with this last form of endometritis, there is a variety resulting from the retention of portions of the decidua, after abortion chiefly, but occasionally after labor at term, *endometritis decidualis*. The retained tissue presents itself as projections from the general surface of the mucous membrane, and is soft and easily detached. Microscopically, it is differentiated by the presence of degenerated decidual tissue, surrounded by a mass of small cells. Clinically it presents symptoms of the polypoid form by the profuse menstrual flow.

Symptoms. The symptoms of endometritis vary to a great extent, according to whether the case be a severe one or not. They may scarcely attract attention, or they may be so pronounced as to render life a burden. *Menorrhagia* is by far the most common symptom. The flow may be profuse and clotted, persisting at times longer than normal, and at others continuing during the larger part of the intermenstrual period, particularly in the fungous or polypoid form.

Leucorrhœa is nearly always present between the periods, although in old cases it may be so slight as not to attract the patient's attention; after sclerosis of the mucous membrane has resulted it may be absent altogether. The discharge consists of a thin clear mucous, or muco-pus. As it appears at the vulva it is milky white, creamy, or greenish in color, owing to its having mingled with cervical and vaginal discharges. When mixed with blood it acquires a pink, brown, or smoky tint.

Pain of some kind is rarely absent. Lumbo-sacral pain is a prominent feature, and it may radiate down the thighs. Dull, persistent, deep seated pelvic pain is also present, extending perhaps to the perineum. If the organ is enlarged and anteverted there will be frequent micturition and vesical distress; if retroverted there will be mechanical constipation, with pain along the sciatic nerves. Unusual or prolonged exercise, especially jolting over rough surfaces, increases the pain. To the local discomforts, neuralgic pains may be added, such as occipital, intercostal, lumbo-abdominal, and facial neuralgias: coccygodynia, gastralgia, meteorism, and similar reflex symptoms may also be present.

Sterility is a common accompaniment, owing to the several obstacles to impregnation, and to proper decidual growth. Sometimes the ovum does not reach the uterus, or it may be destroyed by the secretion, or by forming no attachment to the endometrium.

Physical signs. Palpation shows nothing but a symmetrical enlargement of the uterus. Generally it is tender on pressure, particularly when the cervix is touched. In the absence of complicating diseases of the adnexa, of the utero-sacral ligaments, or of the peritoneal surroundings, the uterus is freely movable. The introduction of the uterine sound is ordinarily, though not invariably, attended by pain, and in most cases a sensitive spot is met with at the internal os. The canal may measure from three to four inches in length, but the sound conveys little information as to the state of the endometrium, unless it be by the induction of bleeding in the decidual or other hemorrhagic forms.

Diagnosis. Pregnancy has been mentioned as a condition with which the lesion may be confounded, but a proper examination and consideration of the signs and symptoms will readily determine which condition is present. It may be mistaken for commencing fibroid disease. If the disease be interstitial, and more particularly if it be subperitoneal, conjoined vaginal and rectal examination will reveal inequalities on the outer surface. If the growth be wholly submucous, it may be detected by the introduction of the sound. The hemorrhagic form may be confounded with abortion, but the early history and a careful examination of the discharges will suffice for differentiation. The diagnosis of certain forms of corporeal and cervical inflammatory lesions from carcinoma is a matter of pressing urgency, for, to be of any service, diagnosis must be made early. Here the free use of the sharp curette and a careful microscopic examination of the scrapings will assist materially in clearing up the difficulty, and should never be omitted in doubtful cases.

Prognosis is usually favorable as far as life is concerned. Taken early, all forms yield readily, but after extensive changes have taken place permanent cure is uncertain. Of all forms, polypoid is the most obstinate, and it also is

the form which appears to tend most frequently to carcinomatous degeneration. Every form tends towards the induction of inflammation of the adnexa and peritoneum.

Treatment. Cases with profuse menorrhagia, unaccompanied by tumors or diseases in the adnexa, pelvic peritoneum, or connective tissue, but with considerable thickening of the mucous membrane; fungous endometritis, and in general all cases that have resisted long continued local treatment, should be submitted to thorough intra-uterine curettage. After completing the operation, it may be considered advisable to touch the surface over with strong carbolic acid, or tincture of iodine, or iodized phenol, and to pack the cavity lightly with strips of iodoform gauze. Subsequently the treatment should be along the lines already enunciated in conjunction with the treatment of acute metritis. Subsequently, an effort must be made to keep up the free drainage through the cervix already established, which may be done by occasionally passing a dilator and introducing a few strips of gauze into the cervical canal. Boro-glyceride or ichthyol tampons may be inserted by the patient once a day, and allowed to remain for twelve hours. After their removal, the vagina should be douched with hot water, and again before reinsertion of the tampon. If the disease does not seem to yield, thorough curetting had better be repeated, and in the intervals, when dilating the os, the endometrium may be lightly touched over with a twenty five per cent. solution of ichthyol, or with stronger preparations, if thought advisable, such as tincture of iodine, carbolic acid, or a twenty five per cent. solution of chloride of zinc. Success in treatment will largely depend upon a removal of the conditions which cause and perpetuate the disease. Retroversion, retroflexion, and prolapse of the uterus may need correction. Inflammation of the cervix, ovaries, or of the tissues surrounding the uterus should be treated.

Special care should be taken at each menstrual period; a few days spent in bed will often do much to check menorrhagia or dysmenorrhœa, should one or the other be present. Throughout the whole intermenstrual period the mode of living should be one of extreme quietude, both mental and physical.

CHRONIC METRITIS.

To this condition the synonyms *chronic parenchymatous metritis*; *areolar hyperplasia*; and *subinvolution and sclerosis* have been applied.

Etiology. Chronic metritis may result from three entirely different pathological states:—First, from interference, from any cause, with retrograde metamorphosis of the puerperal uterus after abortion or labor at term, such as puerperal metritis, retained secundines, septic inoculation, laceration of the cervix, over-exertion after confinement, or suppression of milk. Acute diseases occurring during the period of involution have a similar effect. Second, from congestion long kept up by mechanical causes, such as displacements, pelvic tumors, and chronic diseases of the pelvic or abdominal viscera; or from congestion indirectly produced by sedentary habits combined with constipation, by laborious occupations kept up during the menstrual period, or by long standing cardiac disease. Thirdly, from a formative irritation, or a state of hypernutrition excited by endometritis.

Pathology. After parturition the muscular fibres undergo fatty degeneration, by which the organ rapidly diminishes in size, so that, at the end of the eighth week, the uterus will have returned to its normal state. Untoward influences may retard or check this process, and the uterus will accordingly remain large, flabby, and softer than natural. As a result there is hyperæmia, serous infiltration, and a large increase of embryonic elements. Later an increase of adult connective tissue between the bundles

of muscular fibres arises, which in time compresses the blood vessels, and leads to uterine anæmia with atrophy of the muscular tissues. The uterus becomes harder than natural, and remains for a long time enlarged, but in time begins to diminish in size as a result of contraction of the connective tissue, and in a few cases becomes smaller than normal.

During each menstrual period the uterus, being to some extent an erectile organ; is enlarged and distended with blood. If from some cause it does not return to its normal intermenstrual quiescent state, chronic congestion with hypergenesis of its tissues will follow, and, as a result, the organ will increase in size month after month, until the circulation becomes finally constricted, and in a hardened state the uterus will remain enlarged until after the menopause.

Displacements of the uterus at first result in passive congestion. Fibroids keep up constant nervous irritation that induces hyperæmia. Cardiac disease and abdominal tumors interfere with the return of blood through the vena cava and produce blood stasis, any of which, when continued for a length of time, will induce hypergenesis of connective tissue in the uterine walls.

Course and termination. The length of time which the condition may last is very uncertain. After the connective tissue has once become thoroughly affected it rarely returns to its original condition. The extent of the enlargement of the cervix, the result of areolar hyperplasia, is sometimes very great, equaling in size, at times, a small orange.

Symptoms. After labor or abortion, the first symptom may be a return of the discharge soon after the patient gets up, or the menses may return abundantly in three or four months, while the child is still nursing, or there may be complete menorrhagia. It is not to be forgotten, though, that some women menstruate regularly throughout

the whole period of lactation. In all cases, after the disease has been well established, there will be a dull dragging pain through the pelvis, much increased by locomotion; pain on defecation or coition; and painful menstruation, commencing several days before the flow appears and lasting during the whole period. There is often noticed pain in the mammæ before and during menstruation; darkening of the areolæ of the breasts, if lactation is not present; nervous disturbances; and rectal and vesical tenesmus. As felt bimanually the uterus, in the earlier stage of subinvolution, is enlarged, but more in its long diameter than in its transverse; is slightly softened, somewhat tender, and probably situated low down in the pelvis. The cervix is more or less enlarged and softer than normal. The os is purplish in color, and firm, unless cervical endometritis is present. In cases of long standing, the uterine tenderness diminishes, the walls become hard, the cervix paler in color, and, as sclerosis supervenes, the body becomes somewhat flattened. It might be mistaken for pregnancy in the early stages, but the early symptoms of that condition are entirely wanting.

Treatment. The sooner treatment is adopted the better, before the stage of induration is accomplished. Cases discovered a few weeks after delivery or abortion should be again put to bed and perfect quietude insisted upon. Any causes which may have been etiological factors, such as retroversion or retained secundines, should be removed. Hot vaginal douches three times a day are decidedly beneficial. Internally, fluid extract of ergot given alone, in half dram doses, three times a day, or combined with fluid extract of hydrastis, in ten drop doses, will have a decided effect in promoting involution. Two or three drams of blood may be removed from the cervix by scarification, three times a week, and a tampon saturated with boro-glyceride placed against the cervix and allowed to remain for twelve hours.

In the early stages of menstrual subinvolution, uterine displacement, or other causes which keep up the menstrual congestion, should be corrected. During each menstrual period perfect quiet, with rest in bed, should be enjoined. During the stage of infiltration both forms yield readily to treatment. The appropriate measures to be adopted for such are cleansing the uterine cavity, removing

exuberant and diseased tissue, and checking its reproduction by direct applications, aided by enforced depletion and efficient drainage—the methods for which are identical with that already enunciated in conjunction with the treatment of endometritis. The application, twice a week, of fifty to sixty milliamperes of the galvanic current, with the negative pole intra-uterine,



FIG. 72—Amputation of the cervix with double flaps. *A*, sectional view, showing lines of incision for formation of flaps and method of suture; *B*, front view of cervix, operation complete.

will soften the uterus and promote absorption. Pelvic massage will also stimulate the circulation and promote absorption.

Operative interference is often of much advantage for the purpose of removing redundant tissue, and to alter the circulation and the nutrition of the uterus. If the cervix is lacerated, trachelorrhaphy should be performed. Where there is decided circumferential enlargement of the cervix and the canal dilated, a wedge-shaped piece may be cut out of one or both sides, and the surfaces

brought together as in trachelorrhaphy. When this enlargement takes the shape of an elongation as well as thickening, amputation should be performed.

Schroeder's method for amputation of the cervix. By means of lateral incisions convert the cervix into anterior and posterior lips; next remove the anterior lip by two transverse incisions—one on the vaginal and the other on the cervical side—by cutting upwards towards the supra-vaginal portion of the cervix until the incisions meet each other high up in the cervical tissue. The two flaps thus formed are stitched together. A similar operation is next performed on the posterior lip.

CHAPTER XXII.

DISEASES OF THE UTERUS CONTINUED.

ACQUIRED ATRESIA. STENOSIS. HYPERTROPHY.

Besides the result of a congenital defect, the uterus may become closed later in life, producing a condition known as *acquired atresia*. This condition may be brought about by adhesions forming after child-birth or abortion, or by cauterization with strong caustics or the actual cautery. Sometimes it is simply due to old age, especially when the patient suffers from prolapse. As a result of acquired closure, there may be hematometra or pyometra; the treatment for which consists in overcoming the atresia by puncture, and subsequent evacuation of the contents of the uterus, after the manner previously described.

Stenosis of the cervix is an abnormal narrowing occurring in some part of the cervical canal. It is most common at the external os, where the opening may be found so small as not to admit the finest uterine sound (pin-hole os). Less frequently it is found at the internal os, while sometimes the whole cervical canal is involved

in the stenosis. In acquired stenosis the prominent symptom is obstructive dysmenorrhœa, produced by the difficulty which the menstrual flow meets with in passing through the cervix. If not relieved it may give rise to chronic endometritis and chronic metritis.

Treatment. At one time all sorts of metrotomes and scissors, for the purpose of overcoming the obstruction, were in use, but these have now been abandoned as unnecessary. With the patient under an anæsthetic, the cervical canal is entered by means of a fine dilator (Hanks') and the process of dilatation proceeded with. When sufficiently dilated, a glass or hard rubber stem pessary is inserted into the cervical canal and retained there for two or three months.

Hypertrophy of the uterus. An increased size of the uterus is commonly due to subinvolution or chronic metritis, but it may be also due to simple hypertrophy, independent of inflammatory action. General hypertrophy is a very exceptional condition, the cervix being the part usually affected.

Hypertrophy of the cervix is divided into infra-vaginal and supra-vaginal.

Infra-vaginal hypertrophy consists in an increase in the size of the vaginal portion of the uterus. If congenital, the enlargement takes place chiefly or exclusively from above downwards, resulting in an elongated cervix. If acquired, the cervix is not only elongated, but thickened, and is frequently thicker near the end than at the base.

Treatment. Slight degrees of elongation may be successfully treated by dilatation, which enlarges the os and shortens the canal. If it is more extensive, amputation of the cervix may be called for.

Supra-vaginal hypertrophy consists in the increase, especially elongation, of that portion of the cervix situated above the utero-vaginal junction. This condition is due to prolapse of the vagina, while the body of the uterus

remains in place, the prolapsed vagina pulling down the cervix and thus elongating it. The symptoms are those of prolapse of the vagina, with perhaps the appearance of a hypertrophied cervix at the vulva.

Treatment. In the lesser degrees the uterus may be pushed up, and the cervix supported by a cup-shaped pessary attached to an abdominal belt. In more serious conditions recourse must be had to operation. Simple amputation of the cervix may be sufficient; if not, recourse may be had to supra-vaginal amputation of the cervix, an operation is reality similar to amputation of the cervix already described, only the incisions are made higher up.

Schroeder's method for supra-vaginal amputation. An incision is made through the mucous membrane at the utero-vaginal junction, and the cervix separated carefully all around, for some distance up. A ligature is passed on each side, around the uterine arteries, to control them, as in the operation for vaginal hysterectomy. The anterior vaginal wall is next cut through, and the anterior vaginal mucous membrane stitched to the mucous membrane of the cervical canal. The posterior wall is next severed and the posterior vaginal mucous membrane stitched in a similar way, thus uniting the mucous membrane of the cervical canal all around to the vaginal wall.

Hegar's operation differs from Schroeder's in that the excised piece forms a cone, the length of which may be an inch to an inch and a half above the utero-vaginal junction.

CHAPTER XXIII.

DISEASES OF THE UTERUS CONTINUED.

DISPLACEMENTS.

Even in perfectly normal conditions the uterus is liable to vary greatly in its relations to the pelvic cavity in which it lies. These relations are modified by its own

functional activities, as well as by the distention and evacuation of the adjacent viscera. With this wide range of physiological mobility, it is kept in place by the surrounding connective tissue, by folds of peritoneum as it is reflected over its walls, and by special ligaments, all of which have already been described in an earlier chapter. When it fails to retain its equilibrium, either by excessive movement beyond its normal range, or by losing the power to recover its normal relations, its displacement becomes pathological.

Classification. Five kinds of displacements are recognized:—*Version*, or displacement involving a change in the axis of the uterus. *Flexion*, or deformity involving an increase or alteration in the normal slight anterior curve of the uterine axis. *Prolapse*, or displacement of the uterus in the axis of the pelvic outlet. *Torsion*, or twisting of the uterus on its long axis. *Inversion*, or sinking of the upper part of the uterus into its own cavity, or completely down through its canal, into the vagina.

ANTEVERSION.

The uterus is said to be anteverted when its position is so changed from the normal one that the fundus approaches the symphysis pubis, and the cervix points towards the upper portion of the sacrum. The cause of anteversion of the uterus is usually an increased weight of the organ, produced by subinvolution, hypertrophy, fibroid tumors of the anterior wall—conditions generally accompanied by relaxation of the ligaments and supports, which permit the anteverted uterus to sink down into the cavity of the pelvis.

Symptoms. From pressure of the uterus upon the bladder, there will be frequent desire to urinate. In the erect position, there will be a bearing down sensation, and on attempting to walk, an uncomfortable dragging feeling. By digital examination, the body and fundus of the uterus

will be found close to the symphysis pubis, touching it, or even below it, and the cervix pointing towards the middle or upper portion of the sacral excavation.

Treatment. As in many cases the displacements depend upon subinvolution or hyperplasia, the first attempts at treatment must be for the restoration of the organ to its normal size, after which it will likely return to its normal position without further interference. It would be useless to attempt the introduction of any instrument for the mechanical support of the organ, without such previous treatment, and, as the symptoms are generally relieved after the condition which produced them has been overcome, the large number of pessaries once found in the instrument shops have now disappeared, as being wholly unnecessary in the treatment of this deformity. There is one pessary, Gehrung's, which is still held in favor for anteversion. It is double-horseshoe shaped, and is inserted by slipping it sideways into the vagina, and then turned so that both bars rest between the symphysis pubis and the anterior aspect of the uterus. Operative measures of various kinds, such as fixation of the cervix to the anterior wall of the vagina, and shortening of the anterior vaginal wall, have been proposed and carried out, but they have not been received with much favor.



FIG. 73.—Gehrung's pessary.

ANTEFLEXION.

Anteflexion is an exaggeration of the normal anterior curve of the uterus. The body of the uterus may be bent down upon the cervix, or the cervix may be bent upwards towards the body.

Causes. Congenital. In early life the normal ante-flexion of the uterus is very pronounced. As puberty approaches, the body of the organ develops very decidedly, and tends to become more erect. In some, however, as puberty approaches, such erection of the organ fails to occur, and ante-flexion is the result. Failure of the genital organs to develop symmetrically, or as fast as the pelvis develops, favors the formation of ante-flexion. The short sacro-uterine ligaments draw the upper portion of the cervix backward, while the short, ill-developed vagina holds the lower end of the cervix forward, as in the normal condition in young children. The cervix is thus bent forward into the vaginal axis and, accordingly, is apt to be elongated, conical, and with stenosis of the os, while the ill-developed fundus is forced over the bladder by downward pressure.

Changes in the uterus. Inflammatory changes in the uterine walls, or their relaxation, or atrophy of the tissues at the internal os, favor exaggerations of the normal ante-flexion.

Changes in the ligaments. Shortening of the sacro-uterine ligaments may take place from contraction following parametritis posterior, or from peritoneal inflammation about them. When such occurs the ligaments drag the upper part of the cervix toward the hollow of the sacrum, while the body of the uterus becomes bent in an exaggerated degree by the superincumbent structures.

Significance. In unmarried and sterile women ante-flexion is by far the most common form of displacement. The views held concerning this condition have of late been changed materially, and the exaggerated ideas once held of the clinical importance of ante-flexion have been almost entirely abandoned. Recent investigations have shown that, in minor degrees, ante-flexions are practically of no importance, neither causing pain nor preventing conception; and when of a more marked character they

produce only two possible bad results, namely, dysmenorrhœa and sterility.

Symptoms. As has been explained, the symptoms are not very marked. Aside from dysmenorrhœa and sterility, an uncomplicated flexion produces no symptoms. Certain complications may, however, be present, which, even in the minor degrees of flexion, may produce symptoms such as chronic catarrh of the uterine mucous membrane and spasmodic contraction of the circular fibres at the internal os. The first may produce congestive dysmenorrhœa; the second the obstructive or neuralgic variety. Digital examination will find the cervix well back in the pelvis, and pointing forward almost in the axis of the vagina. The angle of flexion can easily be felt, the cervix lying under, and the body of the uterus over, the finger. By bimanual and rectal examination, it is possible to determine the condition of the ligaments and the extent of adhesions, if any. The sound often gives material help in determining the exact position of the fundus, and to facilitate its introduction, it may have to be bent pretty sharply towards the point. There is a condition known as anteflexion with retroversion, in which, from childbirth, debility, or other causes, the uterine ligaments have become relaxed, and allow retroversion to take place after flexion has become permanent. In such cases the anteflexed uterus falls into retroversion in Douglas' cul-de-sac.

Treatment. The minor degrees of anteflexion require no treatment. Catarrh of the endometrium, engorgement of the uterus, congestion of the ovaries and tubes, if present, should be treated on accepted principles. Parametritis posterior, and adhesions from recent peritoneal inflammation, are benefitted by vaginal tampons. To overcome the two prominent symptoms, dysmenorrhœa and sterility, stenosis of the os must be overcome, the flexion straightened, and the canal kept open. This can best be done by dilatation of the cervix, under an

anæsthetic, and if no inflammatory condition exists to contraindicate it, by the subsequent introduction of a glass stem pessary, to be worn for two or three months. It may be held in position for the first few days by a gauze tampon, and subsequently by a Thomas cup pessary. If, from satisfactory reasons, it is deemed advisable to introduce the glass stem, repeated dilatation with Hanks', or other small dilators, may be employed at the home of the patient. In old cases, with well pronounced endometritis, accompanied by rigidity of the uterus and dysmenorrhœa, thorough dilatation of the cervix, curettage and cauterization of the endometrium should be first performed. The use of pessaries of any kind whatever have been abandoned, the best results being obtained from mechanical treatment. Should impregnation occur, a complete cure may with certainty be promised.

RETROVERSION AND RETROFLEXION.

The uterus is said to be retroverted when the body of the organ is turned backward. According to the degree to which the tilting is carried, the os points downward, or forward against the symphysis, and the fundus turns upward, or backward towards the sacrum. Retroflexion is that displacement in which the body of the uterus is bent backward, the cervix remaining in its normal position. As in most cases of retroflexion some degree of retroversion is present, the os will change its direction also, and in well marked cases, the fundus will be found lying in the lowest part of Douglas' pouch, and the os looking toward the lower margin of the symphysis.

Causes. When the utero-sacral ligaments are relaxed, the cervix is liable to be carried too far forward, and the fundus is then likely to fall backward. When the round ligaments are relaxed and fail in their function of keeping the fundus directed forward, retroversion is favored. Along with changes in these ligaments, there is apt to be

relaxation of the broad ligaments, and of the structures which enter into the formation of the floor of the pelvis, the result of over-distention, subinvolution, or laceration. If the bladder and rectum are prolapsed to some extent, as they are apt to be under such circumstances, the subinvoluted uterus, having lost much of its support, descends somewhat into the pelvis, and a backward tilting of its body is the

inevitable result. Changes in the uterus, causing induration of the uterine tissue, and destruction of its normal flexibility, such as that produced by subinvolution, chronic metritis, and tumors in the walls, render that organ liable to be affected by the influences that press the fundus back-

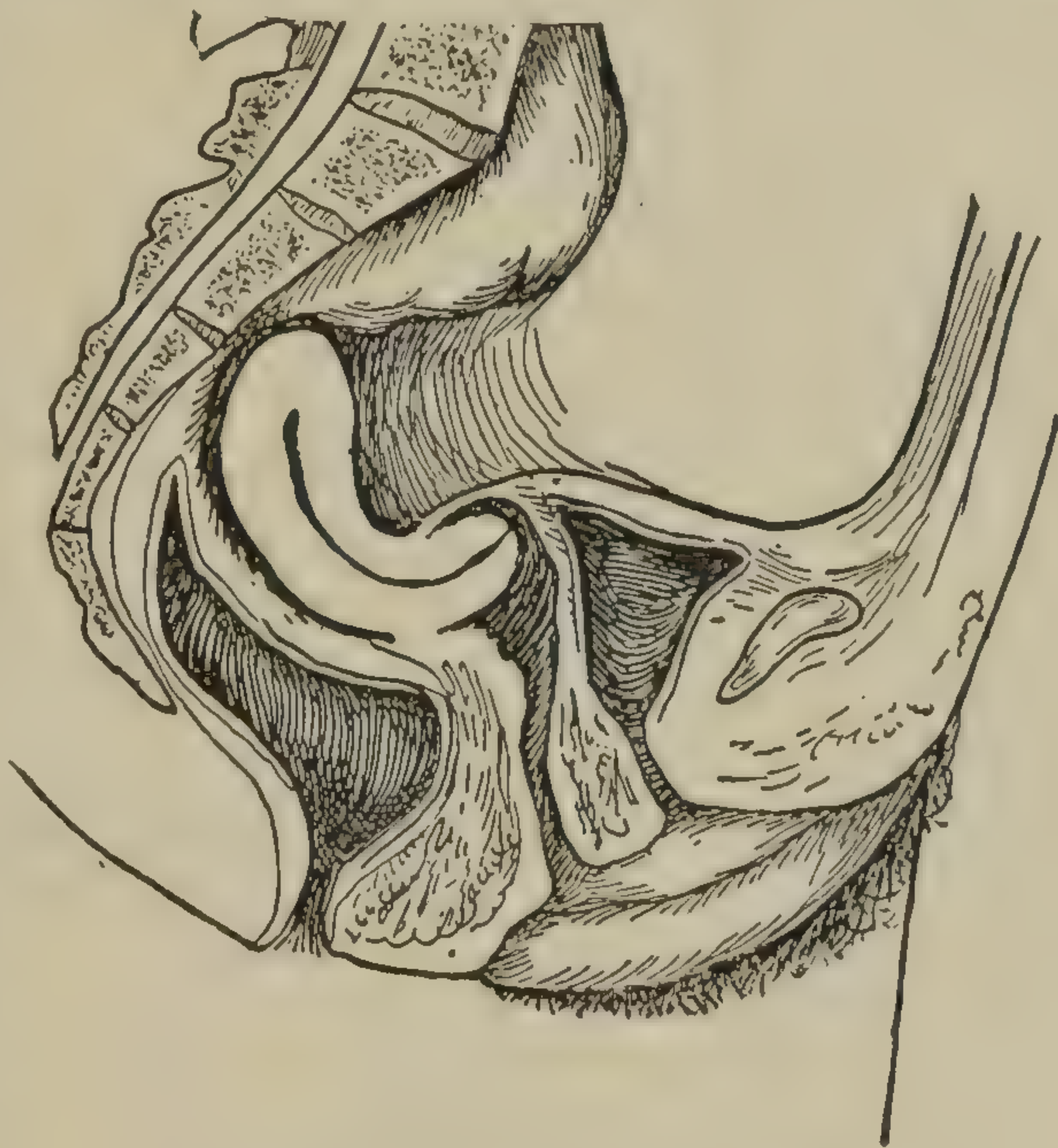


FIG. 74.—Anteflexion with retroposition.

wards, and it will thus suffer retroversion. It may occur as a result of a strain, or fall, or other jar to the body, especially if the accident occurred at a time when the fundus was tilted backward by a distended bladder, and, remaining in that position, is pressed into a persistent state of retroversion or retroflexion by the superincumbent pressure. Habitual over-distention of the bladder will keep the fundus directed towards the promontory of the sacrum, and a permanent retroversion will thus be acquired. A permanent backward displacement is, in some cases, the result of peritonitis leading to adhesions that bind the posterior surfaces of the uterus to the

rectum and to the posterior wall of the pelvis. Backward displacements may arise from congenital defects, or from subsequent want of symmetrical development between the pelvis and genital organs. Congenital shortening of the sacro-uterine ligaments, combined with retarded development of the vagina, will draw the cervix forward, and hold the fundus backward.

Symptoms. Of all the displacements, retroversion and retroflexion are the most common. When the displacement has persisted for some time, the patient will complain of a bearing down or sinking sensation in the pelvis during standing or walking; and pain in the lower part of the sacrum and coccyx, perhaps extending down the back of the thighs along the course of the sciatic nerves. Sterility, leucorrhœa and profuse menstruation are often prominent symptoms. If the ovaries are prolapsed, the pain will be more acute. The function of the rectum may be disturbed, preventing an easy escape of its contents, or causing frequent desire for defecation, accompanied by mucous dejections. Reflex symptoms are often present, characterized by hemicrania, frontal and occipital headache, intercostal neuralgia, gastralgia, nausea and vomiting, or there may be a general depressed nervous condition. The examining finger will find the body of the uterus horizontal, or tipped backward, more or less, into the excavation of the sacrum, with the cervix pointing upward, toward the anterior wall of the vagina, in retroversion; or in the axis of the vagina, with an angle at the junction of the cervix and body, in retroflexion.

Bimanual palpation will show the body absent from its natural position, and the use of the probe will indicate the direction of the uterine canal. If the ovaries and tubes are prolapsed, they will be found lying on either side, or immediately behind the body of the uterus.

Treatment. The treatment consists in the restoration of the displaced organ to its normal position, and its

retention there. Elevation of the retro-displaced uterus may be accomplished by the fingers, posture, and instruments. The usual method is to put the patient in Sims' position, insert the index and middle fingers of the right hand into the vagina, and press the body upward, after which the index finger is passed in front of the cervix and pushes that part backwards, while the middle finger remains in the posterior pouch. If this method fails, particularly when the case is one of impaction, the patient may be put in the genu-pectoral position, and, after admitting air into the vagina by means of a Sims' speculum, efforts are made, by the aid of a depressor or cotton on a holder introduced into the rectum, to dislodge the fundus from the sacral excavation. If these manual and postural methods fail, the reposition may be attempted, with the patient in the dorsal or Sims' position, by means of a large blunt sound or Sims' or Emmet's repositor. The uterus having been replaced, it should at once be retained in its normal position by a properly fitting support, or, if considered inadvisable to use such, by tampons, or gauze packing inserted behind the uterus. It may not be possible to completely restore the uterus at the first attempt, in which case the attempts are to be repeated at suitable intervals, the advantage gained at each attempt being kept up by the insertion of tampons.

Pessaries. There is much diversity of opinion on the use of pessaries generally, but, notwithstanding the progress made in treatment of displacements through surgical aid, pessaries seem to be, to some extent, a necessary evil. As has already been stated, in anterior displacements pessaries are but little used; and in prolapse, especially when there is descent of the vaginal walls, it has been shown, when speaking of rectocele and cystocele, that they cannot be well retained, and hence are of little or no benefit. In retroflexion they are still found to be of much use, but to obtain beneficial results, two indispensable

conditions must be observed:—First, that the uterus should be returned to its normal position; second, that the pessary should be properly fitted, and should, without injury or discomfort to the wearer, retain the uterus in its normal position.

Varieties. The cardinal principle upon which most pessaries for retro-displacements are constructed is that of leverage, first introduced by Dr. Hodge. It acts on the principle of the pushing down of a short anterior lever, and the consequent tilting upward of a long posterior lever, and all pessaries for retro-displacements, with few exceptions, are based on this idea. The instrument devised by Hodge is of equal width at both extremities, and with two curves. Albert Smith modified this form by narrowing and pointing the lower extremity, in order to enable it to rest upon the symphysis—an innovation which has proved

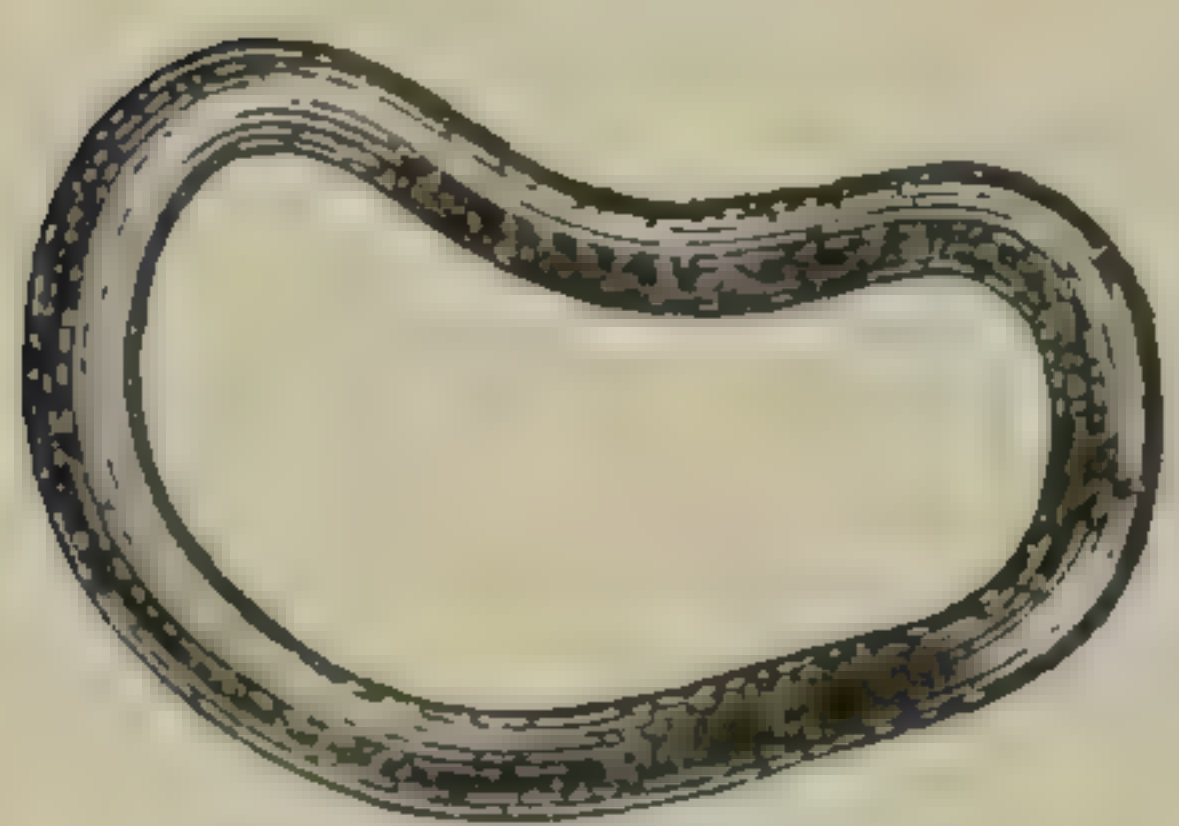


FIG. 75—Hodge pessary.

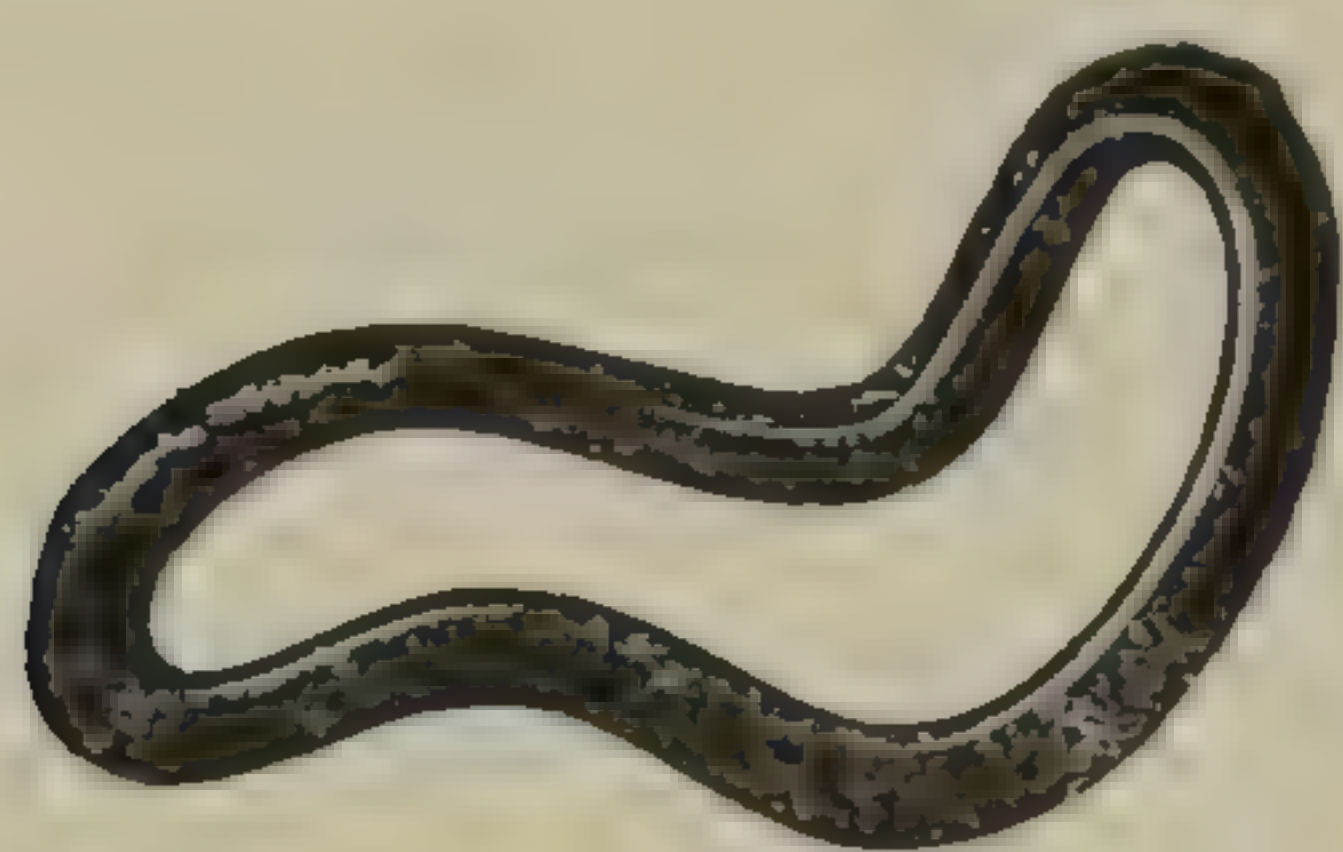


FIG. 76—Albert Smith Pessary.



FIG. 77—Thomas' retroflexion pessary.

a permanent one—and nearly all pessaries are constructed after that plan. According to the length and width of the vagina, the depth and width of the posterior vaginal pouch, the firmness or relaxation of the posterior vaginal wall and perineum, the pessary will have to be broader, longer, or more or less curved. If there is retroflexion, with considerable relaxation of the posterior vaginal wall and uterine ligaments, a pessary with a sharp posterior curve will usually be required. For this form of displacement Dr. Thomas has added a bulbous enlargement on

the posterior crossbar, whereby the body of the uterus is prevented from tipping and bending backwards.

Contra-indications. An immovable, non-replaceable uterus is always an absolute contra-indication to the use of a pessary, whether the cause be recent or remote. So also is the presence of fibroid or ovarian tumors.

Insertion. The patient being placed on the back—some prefer Sims' position—a suitable pessary is selected, and smeared with some unguent. The anterior cross-bar is taken between the index finger and thumb of the right hand, and the pessary held vertically, while the index finger of the left hand is made to draw back the perineum. The pessary is now passed between the vulva, through the introitus vaginæ, and, as it is about to impinge upon the cervix, the index finger retaining the perineum is passed inward, and catching the posterior bar, draws it downward and backward under the os. The right hand continues to push the pessary onward, and at the same time rotates it from the vertical to the horizontal position. The anterior bar must then be depressed downward and backward to settle the pessary in its place, and while so doing the left finger should make sure that the cervix is in its proper place.

A pessary properly fitted should produce neither pain nor discomfort, but sometimes, after it has been worn for a few months, abrasions are formed by pressure, and they may even become imbedded in the vaginal walls. In this way urinary and rectal fistulæ have been formed. After introduction, it is well to allow the patient to walk about, to make certain that it gives no discomfort, after which she should be re-examined to ascertain that the pessary remains in position. The patient should be advised to take a tepid vaginal douche every day and to return from time to time for examination.

When the fundus and body of the uterus are adherent from inflammatory adhesions, or cicatricial contractions,

attempts to replace the organ will usually fail, and an effort must then be made to soften and gradually detach or stretch them. This may be done by careful bimanual and rectal manipulation, by uterine massage, and by vaginal packing with tampons or gauze, with the patient in the genu-pectoral position.

Operative treatment. When a pessary fails to cure the displacement, or when the uterus cannot be held in place, an operation may be performed to accomplish this purpose.

Extra-peritoneal shortening of the round ligaments. *Alexander's operation.* This consists in making an incision over the external inguinal ring on each side, dissecting out, picking up, and drawing out the round ligaments, until the fundus points towards the anterior abdominal wall. The ligaments are then made fast in the wound by buried sutures, which pass through the pillars of the ring and the ligament, after which the redundant part is cut off, and the external wound closed.

Intra-peritoneal shortening of the round ligaments. *Wylie's method.* After opening up the abdominal cavity, the round ligaments are brought into view and denuded on their inner surfaces. Each round ligament is then doubled on itself, and the loop retained in position by the introduction of ligatures, after which the abdominal wound is closed.

Vaginal fixation. Vaginal hysteropexy. With the patient in the dorsal position, and an Edebohls' speculum inserted, a median incision is made in the anterior vaginal wall, from the neck of the bladder to the cervix, after which the bladder is carefully separated from the uterus and vagina as far as the peritoneal reflection. The anterior surface of the replaced uterus is drawn freely forward by means of bullet forceps, and stitched to the incision in the anterior vaginal wall. This operation has now been practically abandoned.

Ventral fixation. Abdominal hysteropexy. This method consists in opening the abdominal cavity, and suturing the body of the uterus to the anterior abdominal wall. This operation has proved very satisfactory, both as to its performance and results, and the only serious objection which can be raised to it is the influence which it will have on pregnancy and labor. From carefully prepared statistics, it has been shown that women subjected to this operation are less apt than others to become pregnant; that pregnancy and labor are, as a rule, uncomplicated. Inertia uteri is, however, not infrequently met with, and serious or insuperable objections to labor may be produced if the fundus and anterior wall of the uterus are imprisoned below the point of attachment between the uterus and abdominal wall.

Various methods have been devised for introduction of the sutures, to avoid difficulties arising during pregnancy and labor. *Kelly's method* consists in suturing the uterus at the junction of the fundus and posterior wall, to the abdominal wall, with buried silk sutures. In this technique the sutures which suspend the uterus embrace only the peritoneal coat of the abdominal wall, and are introduced superficially through the uterus. *Oldshausen* sews the cornua to the abdominal wall by means of silk-worm gut buried at the aponeurosis, the anterior rather than the posterior surface of the fundus being included in the sutures. *Leopold* uses silk sutures passed through the entire thickness of the abdominal wall, one at each cornu, and the third between them. The sutures are passed through the anterior rather than the posterior surface of the fundus, and to ensure firm attachment the peritoneum of the fundus is scraped off. After fixation the abdominal wound is closed in the usual way.

Latero-versions and latero-flexions are either congenital or acquired. In either case they occur through shortening of the broad ligament on the side towards

which the body tips. The only real importance of these displacements, particularly flexions, is the production of sterility. The diagnosis can be readily made by bimanual examination and by the sound. No treatment, unless that of persistent tamponading of the vagina to stretch the contracted ligament, offers any reasonable chance for success.

PROLAPSUS.

Prolapsus is a displacement of the uterus in the axis of the pelvic outlet. Three degrees have been described. In the first degree there is simple descent in the axis of the pelvic outlet, the cervix touches the floor of the pelvis,

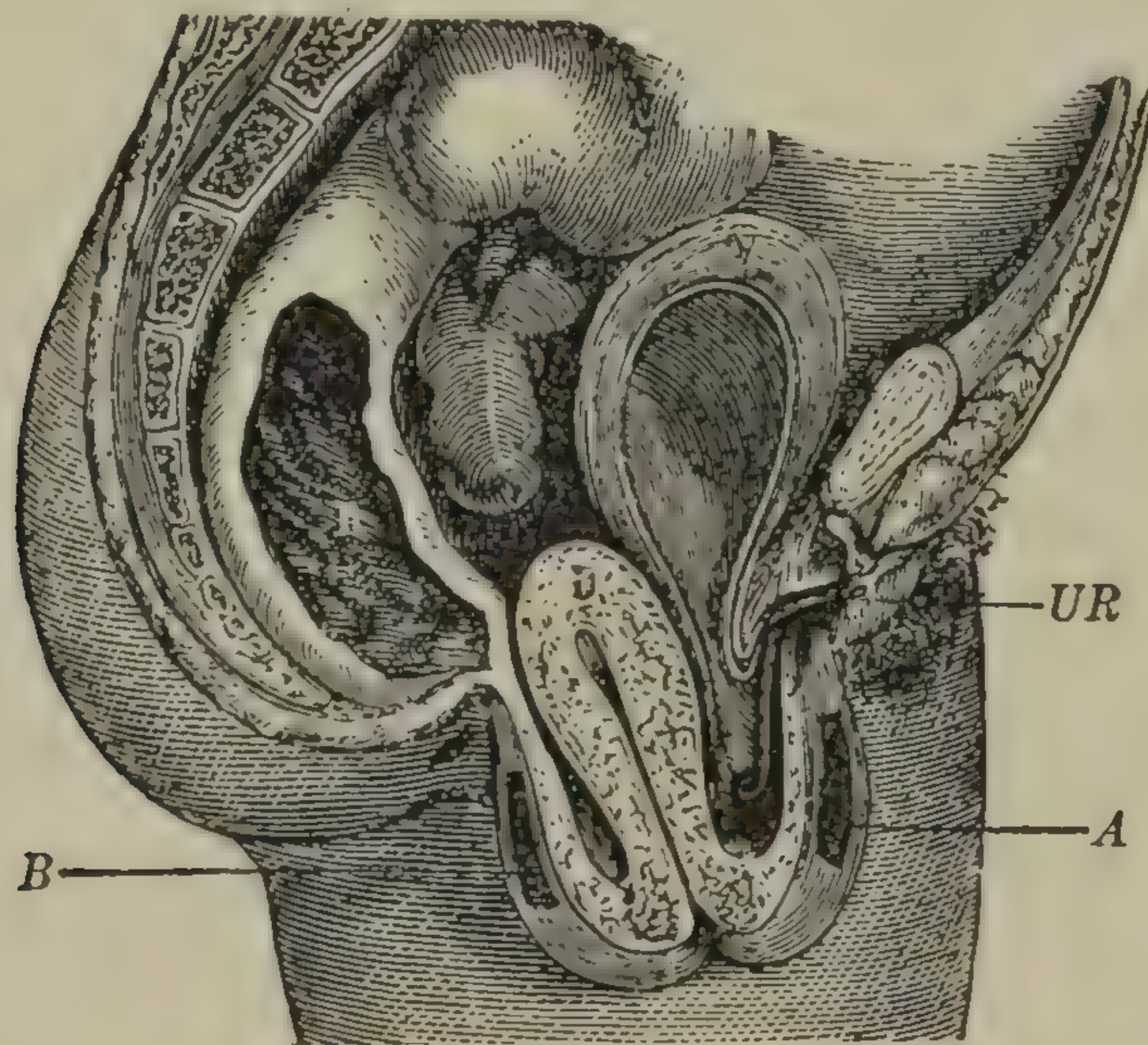


FIG. 78.—Procidentia uteri.

the fundus is proportionately below its normal level, and the uterine axis slightly inclined backwards. Neither the bladder, rectum, nor the vagina is necessarily involved. In the second degree, the external os approaches the vaginal orifice, the body of the uterus is retroverted and lies in the sacral excavation, and usually the anterior vaginal wall, together with the posterior wall of the bladder, accompanies, if it does not precede the prolapse. In the third degree, the cervix protrudes from the vulva

more or less (*proidentia*), even to the extent of the entire extrusion of the uterus. The anterior vaginal wall and posterior wall of the bladder, down to the meatus urinarius, protrude from the pelvic cavity, and in a very large proportion of cases the posterior vaginal wall and the anterior wall of the rectum are prolapsed to the same extent.

Causes. Of the indirect causes, laceration, over-distention, or subinvolution of the perineum after parturition is the prime element in the weakening of the pelvic floor that eventuates in displacements of the pelvic contents. Varying conditions of the vaginal walls arising from over distention or lack of tonicity, and relaxation of the ligaments persisting for some time after parturition, increase as well as facilitate the tendency to descent. Absorption of adipose tissue, such as that which occurs in those suffering from wasting disease, also lessens the natural support and renders its descent more easy. Among the conditions which operate more directly may be mentioned enlargement of the uterus. If, after parturition involution is not complete, or if the organ is hypertrophied as a result of chronic metritis, or enlarged from development of neoplasms in its walls, the increase in its weight, favored by some of the indirect causes mentioned, is almost certain to end in prolapse. One of the most common causes is frequent parturition. A large majority of cases of prolapse occur in women who, after one or more severe child-births, are unable to remain at rest for a sufficient length of time to allow the pelvic organs to regain their normal tone.

Complications. In extreme cases, not only has the uterus descended, but the bladder and rectum will be found displaced, and the ovaries will have descended into the pelvic cavity to the depth of Douglas' pouch. In its descent a chronic metritis may take place, by which the walls are thickened and indurated, and the endometrium

expanded and vascular. One of the most common complications is laceration and eversion of the lips of the cervix, and often accompanied by a lacerated perineum. Hypertrophy of the cervix is also a common occurrence, in consequence of the irritation produced by the laceration. When prolapse is complete the vaginal walls become smooth, dry, and are deprived of their rugosities, and in cases of long standing the epithelium in places takes on the appearance of the epidermis. Imperfect evacuation of the distended bladder leads eventually to cystitis, and the rectum may be the seat of irritation and of undue accumulation of fecal matter.

Symptoms. In cases which develop gradually there may be no decided symptoms at first, but soon backache and a bearing down, dragging sensation about the vulva, with a disagreeable feeling of weakness or want of support, is noticeable. Difficult urination and defecation, and even the symptoms of cystitis, are often prominent. The diagnosis of prolapse of the uterus is exceedingly easy. The examining finger will readily determine that the cervix is lower in the pelvic cavity than it should be, or that it is protruding through the vulva. Bimanual examination will indicate that the fundus is absent from its normal position, and either retroverted, or low down, at or near the pelvic outlet. Accompanying prolapse in the second degree will be found cystocele, and in the third degree both cystocele and rectocele.

Treatment. The treatment of prolapse is either palliative or radical. Minor degrees of recent origin may be treated by astringent injections and by tampons inserted into the vagina in the genu-pectoral position, and later by the insertion of a retroversion pessary. In the more advanced degrees of prolapse, mechanical and palliative means will be found of doubtful benefit, but treatment by means of them may be made when operations are inadmissible. A large soft rubber ring, or pessaries inflated

with air, or made of elastic wire, will sometimes retain the uterus in the pelvis by distending the upper part of the vagina. In most cases of complete prolapse, it is necessary to use a supporter composed of a cup and stem pressing against the vaginal portion of the uterus and fastened below to an abdominal belt. The wearing of it is, however, often very annoying and frequently causes excoriations and ulcerations.

Operative treatment. This consists in applying methods for the diminution of the size of the uterus, for restoring the tone of the uterine ligaments, and for the repair of the uterine supports. These may be accomplished by amputation of the cervix if it is much hypertrophied; by repair of a laceration in it; and by thorough curettage; all of which can be completed at one sitting, after which the ligaments will probably regain their tonicity. The round ligaments may be made at once to renew their support by Alexander's operation for shortening them, already described.

INVERSION OF THE UTERUS.

By inversion is meant a more or less complete turning inside out of the body of the uterus. There may be simply a folding in of the fundus, or a projection of the fundus through the dilated cervix, or a complete inversion of both uterus and cervix.

Inversion comes under observation at three different periods: Immediately after the occurrence of the accident, or that form appearing during or immediately after childbirth; second, about six weeks after labor; and third, that which occurs after a lengthened period, often many years. Leaving out the first form, which belongs more to the subject of obstetrics, two classifications may be made: *Inversion during involution* and *inversion after involution*.

The predisposing causes are, an enlarged uterus and a relaxation or an inability on the part of some portion of

the uterine wall to contract, such as exists at the placental site after labor, or at the place of origin of a sessile intra-uterine fibro-myoma. When such conditions exist, unusual uterine contraction may take place, by which the weakened area is depressed and inverted, and the first



FIG. 79—Incomplete inversion of uterus.

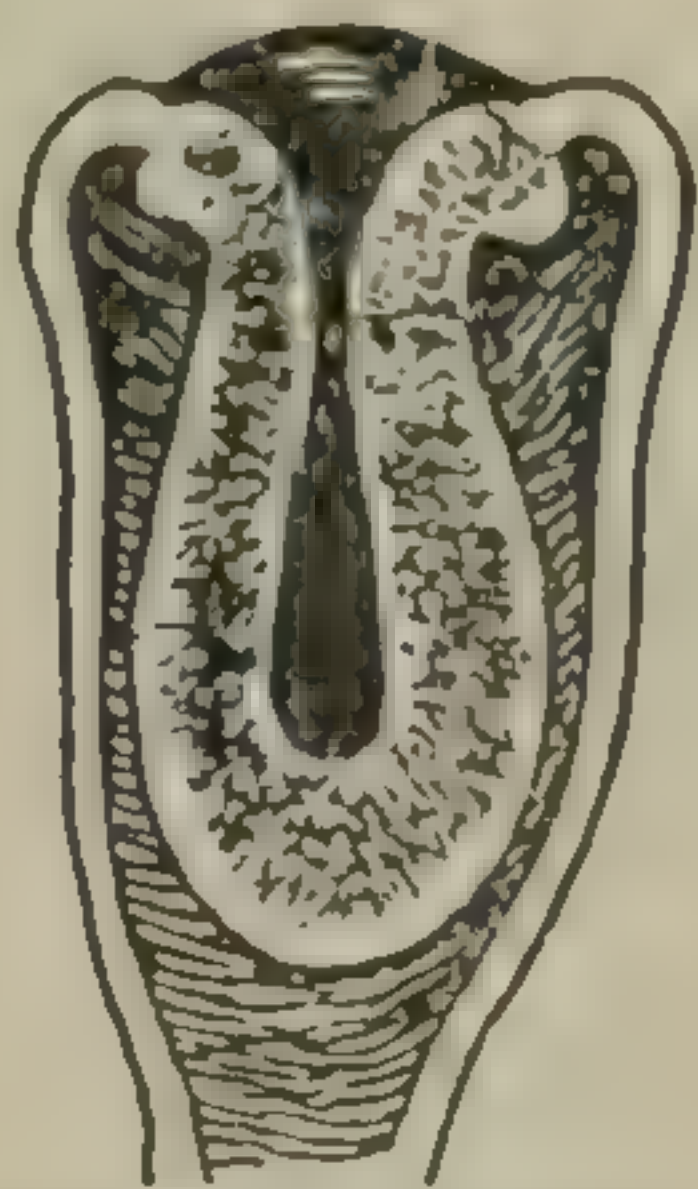


FIG. 80—Complete inversion of uterus.

stage of inversion is initiated. Subsequently a species of peristaltic movement, proceeding from above downwards, is set up in the uterine muscular coats, until inversion becomes more or less complete.

Symptoms. The chief symptom for which a patient presents herself, is repeated hemorrhage, which may already

have undermined the constitution by its frequent recurrence or profuseness. To this symptom are added leucorrhœa, dragging pains, and difficulty in walking. Physical examination will reveal the peculiar condition present. When involution has not taken place, or is not complete, the peritoneal cup formed by the depressed fundus contains all, or a large portion of the uterine appendages, and may also contain loops of intestine. The inverted uterine body projects into the vagina as a large soft, more or less spongy mass, upon which can be discovered small depressions corresponding to the origin of the Fallopian tubes, and from the surface of which blood seems to slowly ooze. Inversion after involution has neither intestine nor uterine appendages in the cup, except the ends of the Fallopian tubes and the ovarian ligaments. The inverted body is firm, pear-shaped, and hangs out of the cervix like a fibroid polypus. The mucous



FIG. 81—Polypus simulating complete inversion of uterus.

membrane resembles granulation tissue, and from it hemorrhage takes place, but not to such an extent as in the previous form.

Diagnosis. Prolapse of the uterus and hypertrophy of the cervix might be mistaken for inversion. In the former the os is found in its normal place, through which the sound readily enters, and the tumor is broader above than below, the reverse being the case when inversion is present. A fibroid polypus with a large pedicle might cause an error in diagnosis. In inversion the uterus is darker and softer than a fibroid, and the sound introduced between the body and cervix discovers no opening into the uterine cavity. A fibroid can be slightly twisted on its long axis without twisting the cervix; in the case of inversion this cannot be done. With a fibroid, bimanual and rectal examination reveals the fundus of the uterus at, or near its proper place. In inversion there is an absence of the fundus, and a cup-shaped depression occupies its place.



FIG. 82.—Fibrous polypus.

Treatment. Inversion should, if possible, be reduced as soon as recognised. The methods for reduction are *manual*, *instrumental*, and *operative*.

Manual. The fingers of one hand, formed so as to make a cone, are inserted into the vagina and the tip of the cone pressed against the summit of the inverted uterus, or alternately against one uterine cornu and then the other, while the other hand exerts counter-pressure, or with the fingers attempts to dilate the ring through the abdominal wall.

Emmet describes a method of reduction in the following way: The hand is passed into the vagina, and, with the fingers and thumb encircling the portion of the

body close to the seat of inversion, the fundus is allowed to rest in the palm of the hand. This portion of the body is firmly grasped, pushed upward, and the fingers immediately separated to their utmost; at the same time the other hand is employed over the abdomen in the attempt to roll out the parts forming the ring, by sliding the abdominal parietes over its edge. This manœuvre is repeated and continued. At length, as the diameter of the uterine cervix and os is increased by lateral dilatation with the outspread fingers, the long diameter of the body of the uterus becomes shortened and the degree of inversion proportionately lessened. After the body has advanced well within the cervix, steady upward pressure upon the fundus is applied by the tips of all the fingers brought together.

Instrumental. Ingenious minds have devised instruments by which a steady pressure can be effected upon the inverted fundus, while counter-pressure is exercised upon the cervical ring. By the use of such instruments reposition of the organ has been effected in less than twenty four hours. A more simple method consists in packing the vagina with gauze in such a manner that the fundus will be pressed upward, in the direction of the axis of the superior strait, while the dilated wall of the vagina makes traction upon the cervix.

Operative. The only operative measure for the reduction of the inverted uterus is that proposed and carried out first by Dr. Thomas. It consists in opening the abdominal cavity, stretching the ring with a kind of glove stretcher, while the hand introduced into the vagina forces the fundus through the ring, and up into its normal place. Should efforts by this method fail, resort may be had at once to hysterectomy to relieve the distressing as well as dangerous condition. Amputation of the inverted uterus, preferably by the elastic ligature, is also recommended when other less radical methods have failed.

CHAPTER XXIV.

DISEASES OF THE UTERUS CONTINUED.

BENIGN NEOPLASMS.

Cysts in the cervical canal are of common occurrence and are erroneously called ovules of Naboth. Like other cysts lined with epithelium, they originate from glandular formation, and are thus a species of adenoma. The contents are liquid, semi-liquid, or form a jelly-like mass. The treatment consists in opening them, and touching the interior with tincture of iodine.

Myxoma. Glandular polypus. All so called polypoid tumors of a jelly-like consistency, and half translucent to the naked eye, appear under the microscope to be made up mainly of myxomatous tissue. They are found most frequently in the cervix, and are usually sessile at first, but have a tendency to become pedunculated and protrude through the os as bluish or purplish red lobules. The symptoms which usually attract attention are leucorrhœa and hemorrhage, and, on examination, a small tumor will, perhaps, be seen protruding through the os. The treatment consists in removal with the curette if intra-uterine, and in torsion if cervical.

FIBROMATA.

To those tumors of the uterus which have the same structure as the uterus itself, the names of *fibroma*, *myoma*, *fibrous tumor* and *fibroids* have been given, and from the fact that they are generally of the mixed variety, composed of muscle fibres and fibrous connective tissue, the corresponding terms *myo-fibroma* or *fibro-myoma* have been applied. They are usually benign, that is to say, incapable of becoming general and infecting the organism, but they are not so harmless as the older authors con-

sidered them to be. The knowledge of the *origin* of these tumors is still very imperfect. Klebs asserts that they have their origin in a proliferation of the connective tissue and muscular layers of certain vessels. Another authority asserts that they are due to a round cell found along the capillaries, which by growth obliterates them; the cells then become fusiform and produce nodules.

The tumor may consist of one mass, or of several distinct masses, developed side by side, and enclosed in a single capsule, or many tumors with individual capsules may be scattered throughout the uterine walls. They vary in size from a tumor the size of a pea to a growth of immense proportions. The majority have their origin in the body of the uterus and most often are situated in the posterior wall; least frequently they spring from the cervix. They are classified according to the relation which the tumor bears to the uterine tissues.

The *interstitial* develop within the uterine walls, and are surrounded on all sides by uterine muscular tissue.

The *sub-mucous* develop immediately or just below the mucous membrane, and project into the uterine cavity without becoming pendulous (*sessile*).

The *polypoid* have their origin under the mucous membrane, on the surface of the muscular wall, from which they project more and more, as they grow, until they become pendulous.

The *sub-peritoneal* or *sub-serous* develop upon, or near the external surface, under the peritoneum, and either project upon the surface, or become pedunculated.



FIG. 83.—Interstitial fibroids.



FIG. 84.—Subserous and submucous fibroid.

The *intra-ligamentous*, an important sub-variety, develop in the thickness of the broad ligament.

Structure. To the naked eye these tumors are composed of dense tissue, shiny, or rosy white, elastic, giving a very clean surface on section, and, when examined under the microscope, exhibit varying proportions of connective tissue and muscle fibre irregularly interwoven. Their vascular supply is relatively scant, but they are apt to be

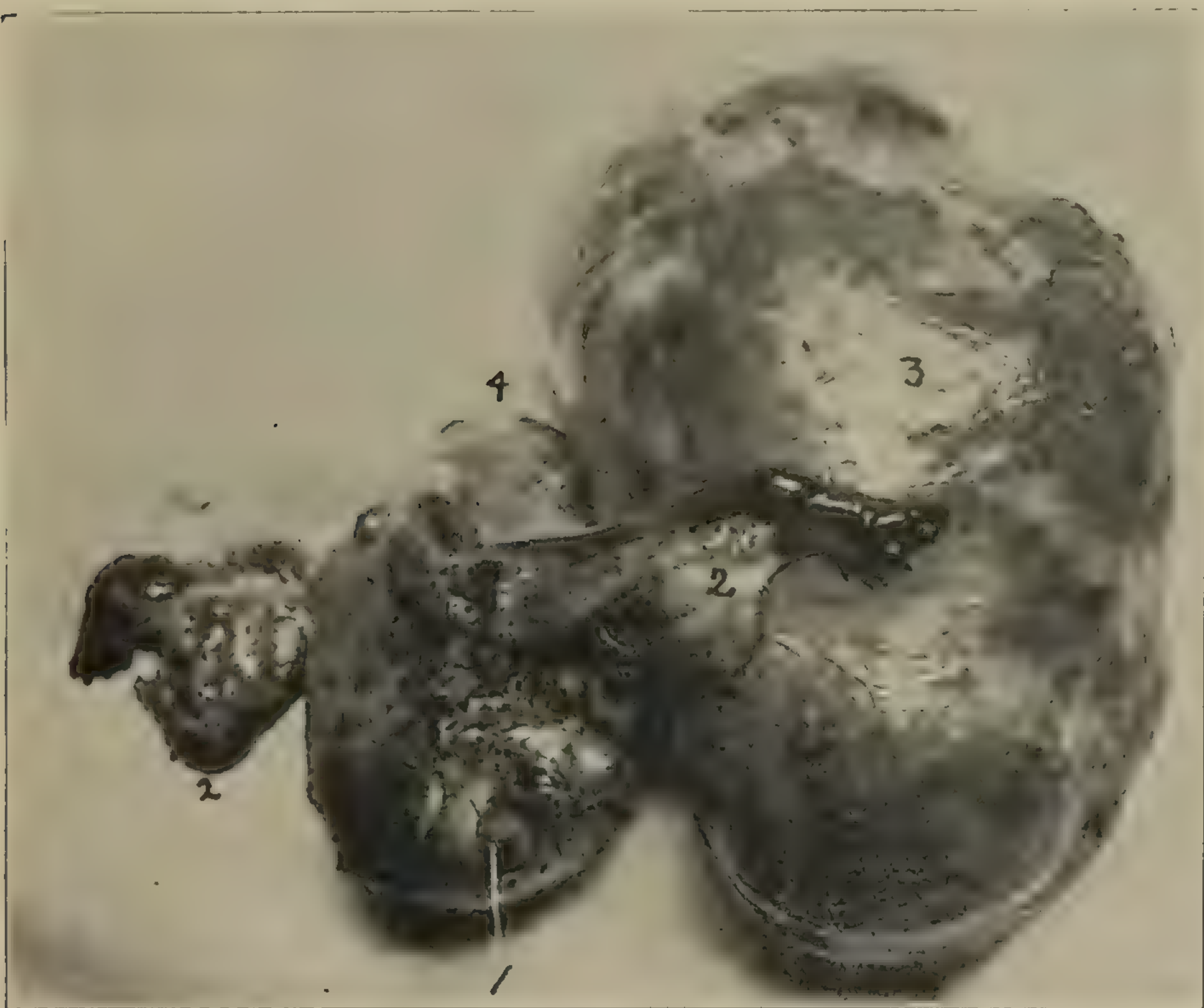


FIG. 85—Large pedunculated fibroid of uterus. 1, cervical canal ; 2, 2, ovaries ; 3, fibroid ; 4, fundus of uterus. (From the pathological laboratory, Queen's University.)

surrounded by vascular and hypertrophic uterine walls. In tumors of considerable size, large arteries are sometimes found under the peritoneum, or in the capsule, and when such a condition exists the peripheral veins are sometimes the size of the jugular, and adherent on all sides to the muscular bundles which hold them wide open. When this arrangement is well marked and the tumor hollowed out by vascular lacunæ due to dilatation of the capillaries,

there exists what Virchow calls "teleangiectatic myoma," or "myoma cavernosum," the portion degenerated resem-



FIG. 86.—Fibro-cystic tumor of uterus. 1. Incision in wall of large cyst. 1, 2. Interior of cyst. 3. Small cyst. 4. Uterine cavity. 5. Multiple fibro-myoma. 6. Fundus of uterus. (From the pathological laboratory, Queen's University.)

bling a sponge soaked in blood. Polypoid tumors sometimes contain large blood vessels, but when removed the

contractility of the walls usually brings about rapid hæmostasis.

Alteration and degeneration. At the menopause most of the fibromata undergo a progressive induration and diminution in volume, and in such a state often persist without causing any morbid reaction. Very rarely they undergo calcification by a deposition of carbonate of lime. During sexual activity they may undergo changes dependent upon physiological processes. During pregnancy a marked increase in size is sometimes noticed, due principally to changes in the circulation causing œdema of the growth. Œdema occurring in tumors existing in a non-pregnant uterus is frequently the forerunner of gangrene. Fatty degeneration is very rare, and where suppuration exists, it is for the most part the outcome of gangrene.

Cystic degeneration is a peculiar process of liquefaction characterized by a primary serous infiltration and associated with myxomatous softening of the growth, accompanied by an œdematous swelling of the connective tissue, followed by more or less disintegration. When advanced, these changes result in the formation of spaces filled with fluid, the walls of which are formed by the non-disintegrated portion of the tumor. At first the muscular bundles prevent the formation of large cavities, and give to the cyst wall a peculiar uneven appearance, like the columnæ of the heart. Subsequently, however, these also become disintegrated and large spaces are formed.

The contained fluid varies in color, from a pale amber to a dark brown, the changes in color being due to extravasation of blood. The fluid, as a usual thing, coagulates spontaneously, and chemical and microscopical examinations show it to contain serum-albumen and fibrin, with more or less mucin, blood, and detritus from degenerated tissue.

Etiology. Although much attention has been paid to the causation of these neoplasms it must be admitted that

little or nothing is known. No single cause assigned has been proved with reasonable certainty.

Symptoms. Small subserous tumors sometimes exist without causing any symptoms. Hemorrhage, either menorrhagia or metrorrhagia, is common to nearly all the fibromata. In the polypoid and submucous varieties it is the most noticeable symptom. In the interstitial variety it is less frequent, while in the exclusively subserous it is very often absent. More or less profuse leucorrhœa, and intermittent watery discharges are also present in the majority of patients. A symptom of equal importance is pain, at times of an intermittent character, and most intense during menstruation. It may arise from painful uterine contractions due to the presence of polypoid tumors, or to retention of secretions; from pressure of a polypoid or submucous growth at or near the internal os; or it may be due to pressure upon the surrounding pelvic tissues, or upon the bladder, rectum, or sciatic or gluteal nerves. Pressure on the rectum may cause obstinate constipation; pressure upon the bladder, vesical disturbances; and on the ureters, retention of urine in the pelvis of the kidney, with subsequent renal changes. Pregnancy is not infrequent, and should it occur the tumors are apt to grow more rapidly, but after parturition they may completely disappear.

Course. Fibromata in most cases run a benign course. They grow slowly and seldom cause death directly. As has been already stated, they often undergo progressive induration and diminution after the menopause. If polypoid they may be expelled by the vagina. Multiple, interstitial, or submucous tumors may attain a great size, but when a large number starts simultaneously, intermediate pressure tends to cut off the blood supply and arrest growth. Submucous and interstitial tumors may become gangrenous, followed by suppuration, and when such a

course is pursued death may follow from peritonitis, septicæmia, or pyæmia.

Diagnosis. Single interstitial, submucous, and polypoid fibroids, if of moderate size, may be mistaken for pregnancy, retained menses (hæmatometra), malignant disease, or subinvolution. A fibroid uterus is harder to the feel than in pregnancy, and the os, although sometimes slightly dilated, is not softened or deepened in color, and there is absence of the familiar signs of pregnancy. A large polypoid growth often dilates the cervix, and may be felt presenting at the os. In hæmatometra the retained discharges give the uterine walls a tense elastic or fluctuating feel, and, on examination, the internal or external os will be found impermeable, and perhaps the menses will have never appeared. In malignant disease, the age of the patient will assist in making the diagnosis. The peculiar offensive discharge is characteristic, and if in doubt curetting and examination with the microscope will make the condition clear.

Subinvolution generally produces cervical, as well as corporeal enlargement, the body is flatter, the antero-posterior diameter being not so much increased as when fibroids are present. Interstitial multiple tumors cause the uterus to enlarge more or less irregularly, and make the canal to become so tortuous that a probe can with difficulty be passed, or even not at all. When the tumors are near the outer surface, the probe may enter readily the full length of the canal, but bimanual examination will disclose the hardened projections on the outer surface of the uterus.

Retro-uterine hæmatocele and hæmatoma may be differentiated by bimanual examination and by the use of the sound. In such cases the uterus will likely be found in front of, or at one side of the tumor, or it may be pushed up behind the pubes, where it can be moved independently of the mass. A small subserous tumor, if pedunculated,

may be mistaken for a diseased ovary. The former is usually firmer to the touch than is the ovary, has a smoother surface, and is not sensitive on bimanual pressure, and the pedicle may be palpated. A tumor partially extruded from the os may be mistaken for cancer, especially when the former is gangrenous. In both cases there is profuse vaginal discharge, but with care the cervix may be shown to surround the protruding mass. Fibro-myomata of the pelvic variety may resemble pelvic exudations, but if the tumors are not adherent they can be displaced by the examining fingers. They do not encroach so closely upon the pelvic wall, and are generally harder to the touch. Intra-ligamentous fibroids are distinguished by their close connection with the uterus, and their unyielding feel to the touch. Cervical fibroids are usually easily recognised by the protuberance in the lip affected, and the flattened appearance of the opposite lip.

Treatment. This may be divided into *palliative* and *radical*; or *medical* and *surgical*. It may be stated at the beginning, that a serious operation should never be undertaken just because a woman has a fibro-myomatous tumor, the growth must in some manner menace life or health, and not be amenable to other treatment. It may also be stated that all medical treatment is absolutely useless in pedunculated subserous tumors.

The hypodermatic use of *ergot* has, in some cases, caused a cessation of growth in interstitial tumors, and even their extrusion, and is therefore applicable for the treatment of such growths, as well as the submucous variety. The effect of ergot is to cause compression of the blood vessels, by producing more or less marked contraction of the muscular structure of the tumor. The drug should be used in the form of ergotine, from one to two grains being injected into the fleshy part of the thighs or buttocks twice daily, the dose being governed largely by the uterine pain produced. Instead of hypodermatic

injections, dram doses of fluid extract of ergot, or two grain capsules of ergotine may be given by the mouth three times daily, or if it disagrees with the stomach, it may be mixed with four ounces of water, and administered by the rectum. Fluid extract of hydrastis, in half dram doses, may also be used with benefit, but the chief advantages from its use lie only in the effect it has in checking hemorrhage. The bromides and iodides, arsenic, mercurials, and such like, do not possess any positive therapeutic value.

Among recent remedies *galvanism* plays an important part, especially the method introduced by Apostoli. The method of application, and the benefits to be derived from this class of treatment, has already been referred to when speaking of the practical application of electric currents.

Subperitoneal tumors, filling the pelvis and causing much distress, can at times be dislodged by pressure upwards through the vagina, with the patient in the genu-pectoral position. Hemorrhage may be treated by dilatation of the cervix, repeated curettage, and subsequent application of tincture of iodine, or carbolic acid to the endometrium.

Beside the administration of ergot to diminish the blood supply, an operation for *ligature of the uterine arteries*, for a similar purpose, is recommended as giving beneficial effects on many tumors, the pedunculated and subperitoneal excepted. With the patient in the dorsal position an incision is made on either side of the cervix, and the connective tissue pushed away until the uterine artery can be felt pulsating. A pedicle needle, armed with a ligature and guarded by the finger, is passed from behind forwards through the broad ligament, above the artery, and after the withdrawal of the needle, the ligature is tied. The artery on the opposite side is tied in the same way, care being observed in each case to avoid the ureters.

Oophorectomy. It has been stated that at the menopause, uterine tumors may undergo retrograde changes, and that the symptoms produced by them may gradually disappear, when menstruation has ceased. With this end in view, oophorectomy is frequently performed to bring about the menopause prematurely and, if the case has been properly selected, will likely produce the desired effect.

Large tumors, those which are soft or œdematous, pure submucous growths, subserous ones with broad bases, fibro-cystic growths, or those which produce painful pressure symptoms, should not be treated by this operation. Cervical fibroids are not amenable to palliative treatment, and should be removed. When pedunculated and small, they may be twisted off; if large, and the pedicle thick, the mucous membrane may be incised all around close to the cervix, and the remainder of the pedicle cut through, after which the mucous membrane is stitched over so as to close in the stump. When sessile or distinctly submucous, the capsule should be incised and the tumor enucleated. After trimming the margins, the raw surfaces are coaptated by deep sutures. If unable to do this, or if there is troublesome hemorrhage, the bed of the tumor, and the vagina as well, should be packed with iodoform gauze. Intra-uterine polypi, smaller than a child's head, may be removed in the same way as the cervical, the cervix having been previously dilated to such an extent as will permit the extraction of the tumor. In cases where the attachment of the pedicle is high up, or difficult to reach, or where there is fear of hemorrhage, a pair of light forceps may be clamped on the pedicle at its attachment to the uterine wall, and the pedicle cut through with scissors. The forceps, carefully surrounded with gauze, are allowed to remain *in situ* for some hours, when they may be removed.

The nature of further operations for uterine fibromata will vary according to the situation and attachment of the tumors. They may be thus classified: 1. *Simple myomectomy*, or removal of the tumor without any of the uterine tissue by excision or enucleation. 2. *Hysterectomy, total or partial*, or removal of more or less of the uterine tissue with the tumor.

Myomectomy. When it is possible to remove the tumor from the uterus without destroying the organ, it should be done. The operation is called myomectomy, and is suitable for all subserous growths, and for such interstitial ones as can be enucleated without entering the uterine cavity.

The abdominal incision. The operation for opening the abdominal cavity has been known by various terms, *gastrotomy*, *laparatomy*, and *abdominal section*, but lately the term *cæliotomy* has been introduced, which, while more fully expressing the meaning to be conveyed, is classically correct. The incision should be made in the line of the linea alba, between the umbilicus and symphysis. After incising the skin and adipose tissue, the aponeurosis is reached, and after carefully dividing this structure the recti muscles are brought into view. These are next separated in the median line, exposing the subserous areolar tissue. After cutting through it, and the peritoneum brought into view, the latter is picked up between two pairs of forceps and incised with the point of a scalpel. It is best to make the first opening not more than two and a half inches long, as subsequently it may be enlarged, should circumstances demand it. Care must be taken not to incise too low, lest the prevesical space be opened or the bladder wounded.

After the abdominal incision is complete the fibromyomatous uterus is brought up, if necessary, partially or wholly through the wound. If there be danger of copious hemorrhage, an elastic ligature may be placed

around the uterus and broad ligaments, below the tumor or tumors to be removed. When the pedicle is large its capsule may be incised a short distance from the uterus, its fibrous tissue enucleated, and the capsule sutured over the base firmly enough to check all oozing. In some cases it is easier to cut the pedicle wedge-shaped, with the thin edge extending up to, or into the uterine wall, and sew up the flaps that are left with deep and superficial rows of sutures. A subserous tumor without a pedicle may be enucleated and its bed sewed up in a similar manner.

Closure of the abdominal incision. Strict attention should always be paid to the proper closing of the wound in the abdominal parietes. The methods vary much, but they all aim chiefly at avoiding the subsequent occurrence of ventral hernia. Three leading principles should be observed in order that good results may follow. The apposition of the raw surfaces should be as broad as possible. Each divided structure should be placed and kept opposite its fellow, peritoneum with peritoneum, muscle with muscle, fascia with fascia, fat with fat. The sutures should not be removed too early. The material used for suturing may be divided into absorbable and non-absorbable agents, the chief among the former being catgut and kangaroo tendon, and among the latter, silk-worm gut and silk.

Methods. Suture in mass or through and through suture. For this class of suture either silk-worm or silk may be used, but the former is the one almost universally adopted. The needle is inserted into the skin at the upper angle of the wound, about three quarters of an inch from the margin of the incision, and, as it passes through each layer—fascia, muscle and peritoneum—they are separately picked up, so as to make certain of their being included in the suture. The needle is carried through on the opposite side in reverse order. The sutures are placed

about three to the inch, and, after all are inserted, the ends are gathered up so as to bring the wound together carefully, and are then tied. Some operators make the sutures include only the structures overlying the peritoneum, the latter being left intact.

Buried or tier suture. For this purpose catgut or kangaroo tendon is used. By means of a continuous suture the peritoneum is first closed. Next the muscular layer is drawn together, next the fascial layer, and finally the skin.

Combined method. By this is meant the combination of suture in mass and of the buried suture. When the through and through sutures are being inserted a few silk-worm sutures are passed through the aponeurosis only, and when tied, are left as buried sutures.

Hysterectomy. By hysterectomy is meant partial or total removal of the uterus. It is termed *complete* when the cervix as well as the body has been removed; *partial* when the cervix has been left. Some surgeons speak of the operation as *total hysterectomy*, even when the cervix is left behind. Another division is made into *extra-peritoneal* and *intra-peritoneal*, according as the pedicle is treated outside or inside the peritoneal cavity.

Indications for operation. Mere bulk may of itself be a sufficient reason. Rapid growth or the development of cysts in soft œdematous tumors; suppuration and sloughing; excessive metrorrhagia which every palliative measure fails to check; pressure on adjacent viscera producing obstruction; uncontrollable pain; the presence of abundant ascitic fluid, are all clear indications for operation.

Besides the *instruments* commonly used in cœliotomy, special large forceps should be provided to clamp on large vascular areas; also two trustworthy clamps for the constriction of the pedicle, and for the latter purpose Koeberle's *serre-nœud*, or Tait's modification of it, is

probably the most efficient. The Trendelenberg is the position most often used. After the abdominal cavity has been opened, information is obtained as to the size, position, relations and possible adhesions. By means of a large vulsellum, or myoma screws, the tumor is brought up into the wound, and ligature of the broad ligament proceeded with. When the tumor is well drawn up, these ligaments will be put on the stretch. Each broad ligament



FIG. 87.—Application of ligatures in ablation of the fibroid uterus.

is tied and divided, after placing pressure forceps on the uterine sides, outside the ovaries and tubes. If the ligaments are very broad, two or even three successive applications of the forceps, each below the previous one, and as many ligatures, may be necessary. The tumor being delivered as fully as its attachments to the vagina and the lower portion of the broad ligament will permit, the bladder is pushed well down under the pubes in front, and sponges are packed in behind to keep the intestines out of the way.

It must now be decided in what way the pedicle is to be treated, whether extra-peritoneal or intra-peritoneal.

Extra-peritoneal treatment of the pedicle. The wire of the serre-nœud is passed around the pedicle, care always being taken to avoid the bladder, and, when drawn

up, the free end is made fast to the moveable pin and as much constriction made, by turning the thumb screw, as will arrest the circulation to its fullest extent without cutting. Pedicle skewers are inserted across the incision, either parallel or crucially, just above the wire, and the tumor removed close to them, leaving only enough tissue to give firm hold. In placing the *serre-nœud*, it should be so arranged that the constricted wire will be well within the parietal wound, and the handle so that it will lie over the pubic region. There are other modes of constriction besides the wire, such as the elastic ligature, and the clamp, but the method described seems to be the favorite one. The parietal incision is closed in the usual way as far down as the pedicle, the lowest stitches being inserted so as to draw the tissues closely around it. The use of styptics, such as perchloride of iron or the actual cautery, to the stump is recommended by some for their charring effects. Subsequently the wound is dressed in the usual way. The whole stump above the wire is removed in course of time by pressure necrosis, but it is not necessary to allow the wire to remain for that length of time, but may be removed as soon as the new adhesions are sufficiently strong. After the pedicle separates, a deep granulating excavation is left, which rapidly fills up even with the skin.

Intra-peritoneal treatment of the pedicle. The operation in its first stages is similar to that already described. If there is fear of hemorrhage an elastic ligature, or wire clamp, may be placed temporarily around the cervix, but this procedure is scarcely necessary when the uterine arteries have been controlled by the broad ligament ligatures. With the same precautions observed for the care of the surrounding structures as already described, an incision is made a little above the attachment of the bladder, and a corresponding incision behind, by which a cup-shaped cavity is cut out and the tumor removed.

The cavity thus formed in the cervix is now closed by buried catgut sutures, and by a separate row of silk to unite the peritoneum. The abdominal incision is then completely closed.

Complete hysterectomy. After ligature of the broad ligaments according to the manner described, another and lower deligation of them is carried out, great care being observed not to include the ureters. The peritoneum is next divided all around the cervix, below the constricting ligature, if one has been used, avoiding carefully the bladder in front and the rectum behind. An opening is made on the top of the vagina, the point being indicated by the insertion of a probe into that canal, and with a few strokes of the scissors the division is completed as close as possible to the cervix. After securing the few bleeding points, the anterior and posterior flaps are united by a continuous catgut or silk ligature. After carefully cleansing out the peritoneal cavity, the parietal incision is closed; should necessity demand it, drainage may be established through the vagina. The vagina should next be loosely packed with iodoform gauze and changed daily after the second day.

CHAPTER XXV.

DISEASES OF THE UTERUS CONTINUED.

MALIGNANT NEOPLASMS.

CANCER OF THE UTERUS.

This disease occurs most frequently between the ages of forty and fifty, although earlier periods of life are not exempt. It was formerly thought that cancer was limited to the cervix, but later experience has shown that cancer of the body, although not so frequent as cervical cancer, is not rare.

Cancer of the cervix. The great predisposition of the cervix to the development of cancer has been noticed by all observers. More than one third of all cases of cancer in women occur in the cervixes of multiparæ, and the frequency is explained by the fact that the cervix is so often subjected to irritation, laceration, erosion, and infection.

Pathology. From a clinical point of view, and when seen at the start, and before the primitive aspects of the part have been altered by their spread to adjacent structures, four classes may be distinguished.

1. *Papillary.* (Superficial cancer of the cervix, vegetative or cauliflower cancer.) This form begins on the vaginal portion of the cervix, and may for a long time be limited to it. Often it starts from cylindrical epithelium which has invaded the external surface. It may take on a fungous appearance, the os and healthy lip being hidden beneath it, and for a long time may show no tendency to spread. Sooner or later, however, it attacks the cul-de-sac and passes on to the peri-uterine tissues; or the extension may take place along the cervical canal.

2. *Nodular.* (Parenchymatous cancer, cancerous nodosities, circumscribed or infiltrated cancer.) This form starts as one or several nodules in the mucous membrane of the cervix, on either the external or internal surfaces, with ulceration only late in the disease. In this form the whole organ soon becomes involved, as well as the adjacent tissues.

3. *Cancer of the cavity.* (Boring or eating cancer). This form develops first in the cervical mucous membrane by an infiltration which soon ulcerates and causes the slow destruction of the part by erosion, and there are cases of this kind where the cervix becomes a mere shell. The body of the uterus is early involved, then the peri-uterine connective tissue, and the vagina last or not at all.

4. *Vaginal*. This is far more common than the others. It begins in the posterior cul-de-sac and invades equally the cervix and the adjacent portions of the vagina, producing extensive ulceration.

Histologically the three kinds most often found are:—

1. *Pavement epithelioma* (squamous epithelioma) is that variety often found in the superficial forms—papillary and vaginal. In the variety called *lobulated*, cellular masses lie between the bundles of muscular fibres. In the *tubulated*, anastomosing cylinders, stuffed full of epithelial cells, penetrate between the muscular trabeculæ.

2. *Cylindrical epithelioma* is usually the form which begins in the cervix and spreads along its cavity, and resembles that of the uterine body. It begins by a typical glandular proliferation (adenoma), and ends as an atypical proliferation (malignant adenoma), which is simply an epithelioma.

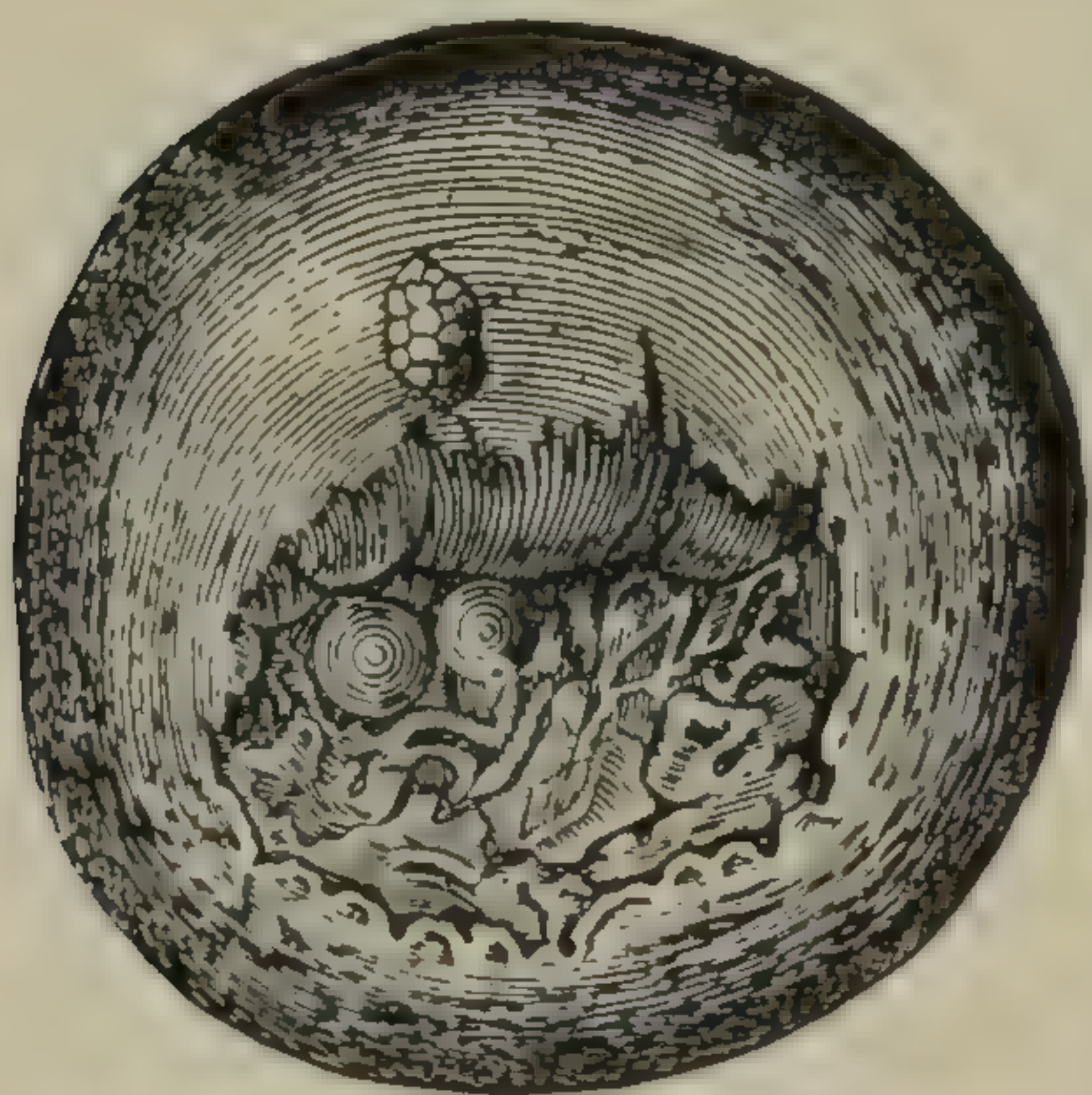


FIG. 88.—Cylindrical epithelioma of the cervix.

3. *Carcinoma* or *atypical epithelioma* is not clearly distinguished from certain forms of tubulated pavement epithelioma. It is characterized by polymorphism of its cells which correspond to those of the al-

veolar wall, or to those of the gland; also by their disposition in masses within the alveoli, the walls of which are formed by anastomosing bands of connective tissue. When the fibrous stroma is small in amount, and the cells are swollen and predominant, the tumor is called *encephaloid*; when hard and dry it is called *scirrhus*.

Extension. At an advanced period of the disease, the characteristics peculiar to each form are lost in the destruction caused by its extension. Extension to the vagina may be found at the outset. It may occur rapidly

in the papillary form, and may even reach the vulva. The body of the organ is very soon involved in the case of tumors of the cervical cavity, and, in the nodular form, it may be infected from the first. The pelvic connective tissue may be invaded from the cul-de-sac, the cervix, or the fundus, by which the uterus becomes imprisoned, as if set in plaster of Paris, and the broad ligaments become thickened and shortened. The ureters, instead of being pushed aside, become assimilated by the neoplasm, and ulceration and fistulæ may result; or they may become compressed producing hydronephrosis and allied conditions of the kidney. The rectum is seldom involved, except in far advanced cases, when the vagina may be found opening both into the bladder and rectum. The peritoneum resists the ingrowth by

the production of adhesions, and is seldom opened. The ovaries and Fallopian tubes may all become affected, and, lastly, there may be metastases to distant organs, as the liver, kidneys, stomach, and lungs.



FIG. 89.—Epithelioma affecting both lips of cervix, vagina and bladder.

Symptoms. The onset of the disease is insidious, and may exist for some time while the patient preserves every appearance of health. The earliest symptoms are in no way characteristic. The attention is often first attracted by a small loss of blood at other than the regular periods, or appearing at variable times after the menopause, especially after some exertion, or after coitus. Leucorrhœa,

without any special characteristics appears, together with some diffuse pelvic pain. Such symptoms should always excite suspicion in one who has passed for some time the climateric period, and a local examination insisted upon. Digital exploration recognizes the induration, or the papillary and ulcerated condition. The speculum demonstrates the livid aspect of the tumor, the yellowish surface of the ulceration and the fungous vegetations if present.

As the disease advances, hemorrhages become more frequent. The vaginal discharge becomes reddish and has a peculiar, characteristic, as well as disgusting odor, and so abundant and acrid that it causes distressing erythema of the thighs and pruritus of the vulva. The local pain now becomes more or less severe, with radiation of it in different directions. By digital examination the vaginal pouches may be found invaded, the uterus more or less fixed by extension of the morbid processes, and the cervix changed by the advancing disease.

The third stage, or that known as the cancerous cachexia, is indicated by digestive disturbances, anorexia, constipation, and by the skin assuming a peculiar pale yellow tint, and by becoming harsh and dry. At this time there may be present cystitis, intolerable neuralgia, phlegmasia dolens, and genital fistulæ, while local examination will reveal wide extension to the adjacent parts. Successive attacks of subacute uræmia may co-exist with these, or the uræmia becoming chronic, the patient gradually sinks into a semi-comatose condition, and quietly dies. Peritonitis, by extension or perforation, may bring about speedy termination, or septicæmia, especially in neglected cases, may alone be the immediate cause of death.

Diagnosis. In this disease, perhaps more than in any other, the necessity for early diagnosis is imperative to be of much benefit. The early stage can never be diagnosed with certainty without microscopical examination of an

excised piece from the suspected part. As already stated, when speaking of endocervicitis, it may resemble follicular erosion, but it differs from it in having somewhat elevated and indurated edges. The raw surface in both conditions may bleed with equal readiness, but if papillary projections are already present, in cancer they break down much more readily. It may be mistaken for a submucous fibro-myoma protruding from the os, but if carefully examined, a healthy ring of cervical tissue will be found encircling the neoplasm.

When the disease begins in the cervical canal, early diagnosis may be extremely difficult. It may have made considerable progress, and yet there may be nothing abnormal in appearance. The chief clinical distinction between beginning cancer and endocervicitis will be found in the fact that the discharge in the latter condition always retains its mucous consistency, while in cancer the discharge is mostly of a watery consistency, and has an offensive odor. A nodule may be suspected to be malignant if it is hard and protuberant, the exterior of a bluish color, and the patient over thirty five years of age. Advanced stages of cancer of any part of the cervix are readily diagnosed by the symptoms already mentioned, but in such instances it is usually impossible to recognize from what part of the cervix it originated.

The *prognosis* is not very good, even with operative interference. Could the disease be discovered in its earliest stages, total extirpation might give better results than they usually do. When the pelvic connective tissue or lymphatics are invaded, or the entire thickness of the cervix involved, a permanent cure cannot be held out.

Treatment. Treatment of cancer may be divided into *radical* and *palliative*.

Radical. Radical operation, to be successful, presupposes conditions which will allow of the total removal of all disease. There must be complete absence of exten-

sion to any surrounding organ or gland, to the peritoneum, broad ligament, bladder, rectum or vagina. The uterus must be freely movable and unassociated with severe pelvic pains. When these conditions exist operation should at once be proceeded with.

High amputation of the cervix by one of the methods described when speaking of hypertrophy of the cervix is recommended, and has been frequently performed, but the operation is not upheld now as being the best, because independent cancerous nodules in the body of the uterus have been observed, and second, the operation, when properly performed, is just as difficult and nearly as serious as complete extirpation.

Vaginal hysterectomy. Colpo-hysterectomy. The patient is placed in the dorsal position, and the knees kept apart and the thighs flexed on the pelvis by means of Clover's crutch. A large Edebohls' speculum is inserted into the vagina, and by means of scissors and a sharp curette, exuberant tissue is cut or scraped away. The uterus being next curetted, and the interior packed with a little iodoform gauze, the cervix is closed with a few sutures. After again thoroughly cleansing the vagina and fornices, a strong vulsellum is introduced into the lips of the cervix and the uterus drawn down. Except when the cervix can be brought outside the vulva, lateral retraction will be of advantage to give the operator more room and light. A pair of scissors is made to cut through the mucous membrane around the cervix, at a distance well clear of the disease. By means of the finger, or by the handle of a scalpel, or by closed blunt-pointed scissors, the mucous membrane is elevated from the cervix all around, the uterus being drawn forward and backward to facilitate the manipulations. In front great care must be observed not to open into the bladder, and if there is any doubt, the introduction of a sound through the urethra will serve as an excellent guide. When the mucous

membrane has been raised from the cervix as high as the peritoneum, that membrane is perforated behind and in front, and a few layers of gauze, secured at one end by means of a ligature, pushed into Douglas' cul-de-sac, to keep the bowels out of the way. The uterus is next well drawn down and the division and closure of the blood vessels of the broad ligament proceeded with. For this purpose a variety of plans have been devised, but the



FIG. 90—Vaginal hysterectomy by ligature.

principal ones may be described under two headings, by *ligatures*, and by *clamps*.

By ligature. The material for ligature may be either good reliable catgut or silk. A pedicle needle armed with the ligature, and guided by the index finger, is introduced behind the broad ligament, close to the uterus, and passed through and made to emerge in front of the ligament as high up above the uterine artery as possible. Another ligature is passed in the same way on the opposite side, and, after being carefully tied, those portions of the broad

ligaments included within the ligatures are divided. The uterus may now be pulled still farther down. If the first ligatures have not secured enough of the broad ligaments to bring the body of the uterus fairly into view, others may be placed on each side higher up. The uterus being now drawn well down, the tubes and ovaries may be felt. A ligature is passed over the infundibulo-pelvic ligament, and after being carefully tied, is divided. The corresponding ligament on the other side will then be very readily ligated, and, after division, the uterus will be free.

If there is much difficulty in bringing the tubes and ovaries into reach they may be left behind, the last ligature passing over the tubes, as they lie in the free margins of the broad ligaments. If the tops of the broad ligaments are beyond easy reach of the finger, or the uterus considerably enlarged, inversion of the fundus, either in front, or behind through the opening in Douglas' cul-de-sac, will always bring them within reach. After removal of the uterus the gauze packing is withdrawn, and steps taken for the management of the vaginal wound, for which various methods have been adopted. The broad ligament stumps may be drawn down with bullet forceps into the vagina, and a full-curved needle introduced through them on either side, entering anteriorly through the vaginoperitoneal margin, and emerging posteriorly in the same manner, and the ligature tied. The opening in the vaginal wall is now closed with a few sutures. Some surgeons recommend that simply the peritoneum should be sutured to the vagina, others that the vagina alone should be sutured, while others leave all the structures to fall into apposition and unite as best they can. The vagina may now be packed with iodoform gauze. When the vaginal wound has been left open, a few strips of gauze should be put in the slit, particularly when drainage is necessary.

The clamp method. The first steps in this method are the same as have already been described. The peritoneum is opened in front and behind, and if it be convenient to do so at this stage of the operation, may be attached to the margins of the vagina. A clamp is now placed on the base of the broad ligaments, one on either side, and the ligaments divided close to the uterus. The uterus is now drawn lower down, and the remaining part of the ligaments

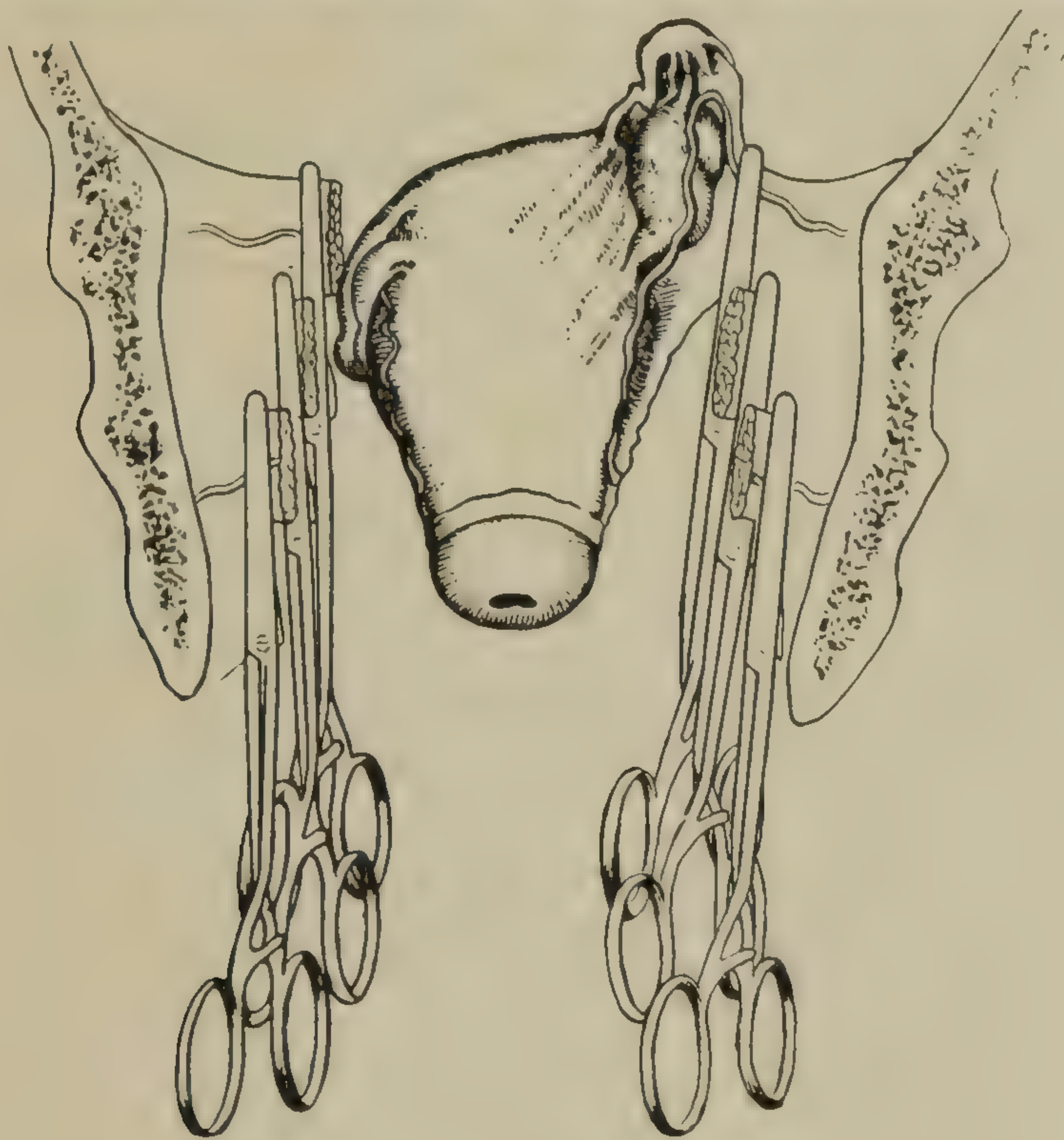


FIG. 91.—Vaginal hysterectomy with clamps.

included in a second pair of clamps, and also divided. The handles of the forceps are securely tied to prevent them from springing open, and wrapped with gauze, after which the vagina is lightly packed as before. The clamps are allowed to remain in place for thirty six to forty eight hours, after which they may be removed. Instead of incising the mucous membrane around the cervix, the thermo-cautery is sometimes used, and as the uterus is

being separated from the bladder, the tip of the cautery knife is kept almost constantly in close contact with the uterus. By this method the operation practically becomes a bloodless one.

Abdominal hysterectomy is at times performed for cancer of the cervix, the advantage claimed for it being that more of the broad ligament can be removed, and by this means it is possible to get farther away from the disease. A combination of the two methods, vagino-abdominal hysterectomy, is also now performed, the upper portion of the uterus being freed by abdominal incision, and the lower portion through the vagina.

Sacral hysterectomy. Kraske's operation for cancer of the rectum has been adapted to the removal of a cancerous uterus, but the operation has not received much, if any encouragement.

Palliative treatment. When the disease has progressed to such an extent as to make radical treatment inadvisable, only palliative treatment is left. Among the various remedies and forms of treatment, curettage, with subsequent cauterization by means of the thermo-cautery, is one of the best. Another efficient treatment consists in packing the crater formed after curettage with a fifty-per-cent solution of chloride of zinc, the vagina and bladder being protected by gauze moistened with a solution of bicarbonate of soda. If there is a tendency to hemorrhage after the removal of the slough, or practically at any time, it may be checked by vaginal tamponade, either alone or combined with some styptic, such as perchloride of iron. Local antiseptic treatment must be constantly kept up. Injection of a one-per-cent solution of creolin is valuable both as a hæmostatic and antiseptic. Peroxide of hydrogen, or a weak solution of permanganate of potash, has a decided cleansing and deodorizing effect. Equal parts of iodoform and charcoal will relieve pain and counteract the objectionable odor. Suppositories made from chloral and

tannin (aa. gr. xv.) will relieve pain, lessen hemorrhage, and counteract the offensive odor.

Narcotics will invariably become necessary at some time during the course of the malady, and it has been claimed that when opium is freely used, the progress of the disease is to some extent retarded. So far no drug has been found that will cure cancer, although from time to time new specifics have been praised. Condurango bark, chian turpentine, methyl blue, have all enjoyed a short lived celebrity. Not much more can be done than to sustain the general health as far as possible, and treat complications as they arise.

CANCER OF THE CORPUS UTERI.

Modern means of investigation have shown that primary cancer of the body of the uterus is not so rare as was once thought. Two varieties may be distinguished, *epithelioma* and *adeno-carcinoma* or *malignant adenoma*.

Epithelioma occurs as a diffuse growth of villi throughout the whole uterine cavity, and consists of an atypical development of epithelial cells of different sizes. It has little tendency to involve the mucous membrane of the cervix, but the uterine wall, little by little, is eroded and destroyed, and the interior of the uterus converted into an ulcerated cavity.

Adeno-carcinoma occurs as an isolated fungoid growth with a large or small base, and at times has the form of a polypus. Histologically the tumors are composed of anastomosing tubules filled with cells. The first layer of cells implanted on the wall is regularly cylindrical, and the successive layers are formed by polyhedral cells which are, at times, of the pavement variety. The interior of the mass also contains alveoli, lined with one or two layers of epithelial cells, as well as cavities containing mucous and free cells. At a later period, in both varieties, metastatic nodules form in various parts of the parenchyma,

and even under the peritoneum, forming protective adhesions and metastatic nodules there. Frequently these metastatic nodules are found superficially in the vagina, and deeply in the ovaries and tubes.

Symptoms. Hemorrhage is the primary symptom, and, as in cancer of the cervix, it is usually accompanied by a serous discharge, of a reddish color and disagreeable odor, and with this there is often a discharge of small shreds of tissue from the broken down parts of the fungosities. Symptoms of uterine inflammation are often noticeable,



FIG. 92.—Medullary cancer of body of uterus.

but, as the disease becomes more advanced, the pain takes on a paroxysmal character which is remarkable and also pathognomonic. These crises have none of the characteristics of colic, and are peculiar from their appearance, at almost regular hours, once or twice a day. Bimanual examination shows the organ to be increased in volume. It remains movable for a long time, but finally becomes imprisoned by adhesions. The cervix is found free from disease, but often is much softened and partly open.

The sound reveals an increase in the capacity of the uterus, and the presence of irregular masses. The general health fails as the neoplasm develops and terminates in cachexia.

Diagnosis. In the early stages this may be very difficult. The hemorrhage, the serous discharge, the increase in the volume of the uterus, and the results of intra-uterine exploration, constitute the clinical elements of the case, while the microscopical examination of portions removed by the curette clearly differentiates between cancer and metritis without malignant neoplasm, or between carcinoma and sarcoma.

Treatment. When seen sufficiently early the only treatment is total eradication of the uterus by hysterectomy.

SARCOMA.

Sarcoma is a comparatively rare form of malignant disease of the uterus. It may occur at any period of the sexual life of the woman over twenty years of age, but is most often found just before, or just after the menopause. There are three well defined forms of sarcoma.

Fibro-sarcoma. This form occurs in tumors or masses, and has a striking resemblance in growth and structure to fibro-myomata. Like them they occur as submucous, interstitial, or subserous tumors, and have their origin also in the parenchyma of the uterus, but instead of being limited by a loose capsule, it is, as a distinctive characteristic, deeply rooted. The vast weight of authority is in favor of the view that they are malignant transformations or degenerations of the ordinary fibro-myomata. Histologically they show a proliferation of round, and in places fusiform cells, more or less replacing the normal tissues of the uterine wall. When they have a pedicle it is apt to be fibrous, intimating that it has come from a degenerated fibro-muscular polypus. They give rise sometimes to metastatic growths in distant parts

of the body, but show little tendency to disintegration or transformation. Occasionally cystic degeneration takes place, giving rise to *cysto-sarcoma*.

Diffuse sarcoma. Sarcoma of the endometrium closely resembles the typical form of carcinoma of the same structure. The term is used to designate a new growth proceeding from the connective tissue of the uterine mucous membrane, consisting mostly of small closely packed round cells, though sometimes spindle-shaped, and producing soft villous or lobulated tumors of an encephaloid aspect. The tissue does not break down as readily as that of epithelioma, but is apt to fill the uterus and present at the cervix. The uterine walls are gradually invaded, and become a mere shell filled with the encephaloid mass. This form is found most frequently in young women.

There is a rare variety, *malignant deciduoma* (sarcoma uteri deciduo-cellulare). Many authorities dispute this variety of sarcoma as a particular form, considering it simply a mixed sarcoma. It is developed soon after parturition or abortion in the placental remains or decidua, and is composed of polymorphous decidual cells, and giant cells embedded in connective tissue.

Sarcoma botryoides, or grape-like sarcoma (papillary sarcoma of the cervix) is a variety which appears in the cervix, and as such is characterized by its grape-like form. Clinically, it is extremely malignant. The mass is soft in consistence, and grows to a large size, often filling the vagina. The disease spreads along the mucous membrane into the uterus, and to the vagina, and finally invades the pelvic connective tissue and peritoneum.

Symptoms and course. All forms run a more rapid course than the corresponding carcinomata after the symptoms first attract attention. Fibro-sarcoma gives rise at first to the same symptoms as fibro-myoma, and it is stated that when a tumor, previously existing as a fibro-

myoma, begins to grow at the menopause, it is undergoing sarcomatous transformation. When post-climateric growth occurs, two symptoms soon appear. One is pain, owing to tension or invasion of the peri-uterine connective tissue, the other is marked deterioration in the general health. If the neoplasm has developed from a submucous fibro-myoma, there will be severe hemorrhage, and pain from the efforts of the uterus to expel the tumor. As it advances in growth, in addition to occasional violent hemorrhage, it may cause a sanious hydrorrhœa, and the discharge will sooner or later take on an offensive odor. Owing to the intense anæmia, sapræmia, and marasmus, death is readily produced. Death may occur from peritonitis, intestinal obstruction, or from pressure on the ureters. In the diffuse form the symptoms are not distinguishable from carcinoma affecting the same structures.

Diagnosis. With the exception of the rare form, sarcoma botryoides, it cannot positively be diagnosed without microscopical examination. The clinical symptoms must be carefully observed, and in this there are two points deserving special attention; first, the rapid growth, at or about the menopause, of a tumor previously known to exist; and second, a more marked anæmia and deterioration of health than is ever found associated with the same stage of growth of a benign tumor.

The *treatment* is, as in other forms of malignant neoplasms, palliative or radical. If the uterus is movable, and there is no metastasis or invasion of the vagina, total extirpation of the uterus is at once to be undertaken.

CHAPTER XXVI.

DISEASES OF THE FALLOPIAN TUBES.

Malformations. The tubes show a number of developmental anomalies, but they are of little importance except in the study of the etiology of tubal gestation. Accessory fimbriated extremities are not uncommon. There may be an accessory uterine orifice, or the whole duct of the tube may be duplicated. In connection with imperfect development of the whole sexual apparatus, the tubes may also be non-developed; they may possess an abnormally small calibre; they may be without any lumen; or they may be entirely absent. On the other hand, the tubes may show an abnormally great development, with corresponding patency of the canals. They may be congenitally displaced backward and downward into Douglas' pouch, or they may be wound in a spiral, or abnormally contorted.

SALPINGITIS AND ITS COMPLICATIONS.

The important position taken by inflammation of the uterine appendages has but recently been generally admitted. To thoroughly understand the close association of inflammation of one organ with that of the other, the common embryonic origin of the uterus and tubes, and the close association of the ovaries, must be borne in mind. The various coats of the tubes and ovaries are continuous with each other, a fact which explains the possibility of ascending salpingitis following endometritis, just as ascending pyelitis may follow chronic cystitis. The ovary, which is connected with the tube by the tubo-ovarian ligament, and almost in direct contact with the ampulla, may also be easily infected by continuity. In addition, these organs are intimately bound together by important vascular and lymphatic vessels, so it may be said that there is scarcely ever a salpingitis unaccompanied by ovaritis, or an ovaritis uncomplicated by salpingitis.

Salpingitis and its results may be studied from a clinical and anatomical standpoint under the following classification:—

- | | | |
|-------------------------|---|----------------------------|
| Non-cystic salpingitis. | { | a. Acute catarrhal. |
| | | b. Acute purulent. |
| | | c. Chronic parenchymatous. |
| | | (Pachysalpingitis.) |
| Cystic salpingitis. | { | a. Hydrosalpinx. |
| | | b. Pyosalpinx. |
| | | c. Hæmatosalpinx. |

Acute catarrhal and purulent salpingitis. The chief causes of salpingitis are inflammatory conditions of the uterus, gonorrhœal infection, puerperal infection following parturition or abortion, and contamination from surgical exploration or interference.

Pathology. In the *acute catarrhal* form the tube is swollen cylindrically, from about the size of the little finger to that of the thumb, and owing to its lower border being attached to the broad ligament, becomes more tortuous. The lesions are especially marked in the mucous coat, being thickened, infiltrated with round cells, and moistened with abundant mucous secretion. The normal folds are swollen, and covered with lateral newly formed vegetations. In places they are agglutinated, enclosing spaces between them, giving the appearance of glandular formation. The epithelial cells, as a rule, maintain their integrity, and the fibro-muscular coat is but slightly affected, there being only a hyperplasia of its substance. The fimbriated extremity is at first patulous, but later the fimbriae become contracted and folded up. The uterine ostium generally remains patulous, through which the excess of mucous is discharged. In some cases a few drops of mucous escape through an unclosed fimbriated extremity, giving rise to a slight localized peritonitis.

In *purulent salpingitis* there will be evidences of extensive inflammation. The tubes are swollen, twisted

and tortuous, and the fimbriae so agglutinated as to close the abdominal orifice. On section it is found to be filled with a creamy pus, the cavity often resembling a string of beads owing to contraction. The pus can easily be evacuated through the uterine cavity, as the ostium internum is not occluded like the ostium abdominale. The mucous membrane is of a grayish tint, and under the microscope a transverse section shows thick reduplications, forming a system of primary and secondary folds enclosing irregular cavities that look like glands. This thickening is due to the infiltration of migratory cells in the connective tissue. The ciliated cells are destroyed, and the epithelial cells are changed in shape. The whole thickness of the wall is also infiltrated with round migratory cells, and the blood vessels are dilated. In the beginning the disease is usually confined to one side, but if left unchecked, is apt to affect the other. Usually some exudate appears on the serous surface, forming adhesions with the surrounding surfaces, but the greatest amount of localized peritonitis and adhesion is set up by an occasional exudation of pus from the abdominal end, which, when frequently repeated, has the effect of agglutinating the pelvic organs, omentum, and intestines into a matted mass. Accumulations of pus or serum between the adhesions are occasionally found, sometimes displacing the uterus laterally or forward.

Interstitial salpingitis represents an advanced stage of the purulent form. Both tubes will be found involved, and the lesions, instead of being limited for the most part to the mucous membrane, include the whole thickness of the walls, so that they become thickened, hardened, and purplish in color. Sometimes the induration is general; at times it is more marked in places, giving the tube a peculiar nodular appearance. The mucous membrane is dark blue in color; the villi are enlarged, united, and in part destroyed by small celled infiltration. False glands and cystic spaces are thus produced at some distance

below the surface. The external orifice is always obliterated, but the uterine orifice is more or less pervious. The mesosalpinx may be expanded by the enlarged tube, or it may be folded up by adhesions, or infiltrated by inflammatory products. The ovary, which often preserves its integrity in the catarrhal form, is usually affected. It is generally displaced, fixed by adhesions in Douglas' pouch, or to the sides of the pelvis, or it may suppurate independent of the tube. The peritoneal adhesions, which may also involve the omentum and intestines, are dense and strong, and are sometimes so firm that they cannot be broken up without



FIG. 93.—Salpingitis with pelvic peritonitis and adhesions posterior to the uterus.

laceration of the peritoneal surfaces, or even of the walls of the viscera. Organized bands may extend between the surfaces in all directions, so as to make it difficult at times to determine the relations of the parts after the abdomen has been opened.

Symptoms. As acute salpingitis usually occurs in patients already exhibiting symptoms of endometritis, it is difficult to decide with precision to which lesion the symptoms are due. Pain situated in the neighborhood of the appendage, or in the lumbar region, and radiating upward to the epigastrium and downward to the thigh, is generally present. A bimanual examination elicits tenderness and fulness on one side of the uterus, and some pain when that organ is moved or displaced by the finger. Leucorrhœa is present to a greater or less extent, and when the menstrual flow appears it is usually very pro-

fuse. General constitutional symptoms may appear, such as a feeling of malaise, neuralgic pains scattered over the body, and a slight rise of temperature and pulse. Should mucous escape through the outer opening, there will be an exacerbation of the symptoms, characterized by increased pain in the iliac region, local tympanites, nausea and perhaps vomiting, and other symptoms of a mild form of local peritonitis.

When the salpingitis is of the purulent form the symptoms may be similar to those just described, but they are likely to be more pronounced in character, and slower in subsiding. Should gonorrhœal pus make its escape through the outer ostium, the peritonitis may not be much more severe than that already described, but when the case is one of mixed infection, an extensive pelvic peritonitis will be set up, accompanied by great tympanites, high temperature, rapid pulse, extensive pelvic pain and tenderness, and as a result, there will be an abundant peritoneal and cellular effusion which becomes hard and solid, like plaster of Paris, and which may partly or entirely fill the pelvis. The symptoms may last for a few days, and after confinement to bed for a few weeks, the patient may, as far as her symptoms are concerned, entirely recover for a few weeks, months, or even years. Sooner or later, however, perhaps after some unusual exertion or exposure to cold, more particularly at the menstrual period, a recurrent attack of peritonitis will make its appearance with the same suddenness as before. In many cases the symptoms do not subside entirely, but remain in a semi-quiescent state, the patient suffering more or less from the milder form of symptoms in the intervals. When the attack results from direct infection during abortion or operative procedure, the symptoms of a general infection will probably predominate, indicated by chills, high pulse, exacerbation of fever, the temperature rising and falling three or four degrees once or twice daily, being highest in

most cases in the afternoon or early evening. Other symptoms of a general peritonitis may rapidly follow, such as abdominal distension, labored respiration, a weak thready pulse, persistent vomiting, and cold clammy perspiration, all indicating that death is near.

A vaginal examination will reveal an enlarged and tender uterus surrounded by highly sensitive infiltrated tissues, in which a hard mass may or may not be found. In severe cases abdominal palpation may reveal a tender exudate extending from the enlarged uterus, but when the symptoms have been mild, there may be nothing but deep-seated tenderness.

The symptoms of interstitial salpingitis are those of an ailment which has extended over a considerable length of time, with more or less severe attacks of pelvic inflammation occurring at varying intervals. There may be a history of but a single attack of pelvic peritonitis, but that is exceedingly rare. There will more likely be a history of recurrent attacks, with intervals of good health, or of semi-invalidism, during which the patient is incapacitated by pain or discomfort from the ordinary duties of life. Between the attacks the symptoms of endometritis are seldom absent. There will likely be a burning pain in one or both iliac regions, radiating into the lumbar, gluteal or sciatic regions. Painful micturition and defecation, dysmenorrhœa and intermittent or constant leucorrhœa are often present. In the earlier stage, when pus is present, there is apt to be an afternoon rise of temperature, possibly a degree or two, but after the disease has lasted for a length of time, and septic influences disappear, the temperature will probably remain normal throughout the day. Along with these symptoms there may be those of a general nervous disturbance, such as nausea, indigestion, neurasthenia and hysteria. A bimanual examination will reveal an enlarged, hard, tender mass behind or beside the uterus, with more or less immobility of that organ, or

the uterus may be fixed in one side of the pelvis by bands of adhesions, and surrounded by a thickened and hard mass. The discharge issuing from the cervix may be thick tenacious mucous or muco-pus. The uterus itself will be found in a condition of subinvolution, or of chronic metritis.

Prognosis. Catarrhal salpingitis frequently ends in restoration of the tubes to a practically normal condition. When the disease, however, has existed once, it is apt to be reproduced by the accompanying endometritis; or a purulent salpingitis may be established. Purulent salpingitis may endanger life, owing to the escape of pus through the ostium abdominale and the consequent local or general peritonitis or abscess formation. There is, as a rule, sterility, or a strong tendency to the occurrence of ectopic gestation. Interstitial salpingitis usually condemns the patient to more or less chronic invalidism. In some cases it involves all the dangers of pyosalpinx, while in others there may be a gradual improvement of both the local and general symptoms, a recovery from septic conditions, and a final restoration to comparative good health.

Treatment. As the disease is usually an extension of endometritis, much may be done to prevent its occurrence. Acute metritis following labor, abortion, or operation, should, as soon as diagnosed, be treated on thoroughly active and antiseptic principles, and the same advice is applicable in cases of gonorrhœal infection. It may be necessary to curette the uterus, after which it may be touched over with strong carbolic acid, and the antiseptic treatment subsequently kept up by vaginal or intra-uterine douches. The treatment of catarrhal salpingitis is identical with that of endometritis. Absolute rest in bed is necessary, and measures taken to relieve congestion, and favor drainage of the uterus and tubes. Hot fomentations should be continually applied over the abdomen and vulva, and a hot water bag beneath the lumbar region. A sharp

saline cathartic, such as sulphate of magnesia or soda, Rochelle salts or phosphate of soda, should be at once administered, and repeated sufficiently often to keep the bowels relaxed, and in the intervals a mild febrifuge mixture may be prescribed. If much pain is present it may be relieved by phenacetine, Dover's powder, or small doses of morphine, or by the introduction of an anodyne into the vagina or rectum by means of a suppository. Warm vaginal douches should be administered every four to six hours, while the patient lies on her back upon a bed-bath. As the acute stages are subsiding the fomentations may be withdrawn, and the lower abdomen painted over with tincture of iodine. The douches are, however, to be continued, the temperature of the water being gradually elevated to the maximum degree which the patient can endure without much discomfort.

The same treatment is applicable to purulent salpingitis at the outset, with the addition of intra-uterine douches every eight to twelve hours, if the os will permit the entrance of the instrument. In case that it will not, it may be advisable to dilate the cervix for that purpose. When severe peritoneal symptoms are present, vaginal and intra-uterine douches, and all manipulations likely to interfere with absolute rest, should be avoided until they have subsided. If there is decided rise of temperature, especially when intermittent, quinine, in five grain capsules, will act better than any other febrifuge treatment. After the subsidence of the symptoms of an attack, prophylactic treatment should be continued, and every effort made to prevent the recurrence. For this purpose the patient should avoid all worry, excitement, fatigue, or over-work, resting, if possible, for a few hours every day. Antiseptic vaginal douches and mild counter-irritation over the abdomen should be continued, and during the menstrual period she should remain in bed. Drainage through the uterus should be encouraged and kept up, and for this

purpose the cervix should be dilated once or twice a week, and the uterine cavity touched over with some mild but efficient antiseptic, such as a twenty-five-per-cent solution of ichthyol in glycerine. After each treatment the vaginal vault may be painted with tincture of iodine, a tampon of cotton saturated with boro-glyceride placed against the cervix, and the vagina lightly packed with gauze.

When the case has become chronic, and there is but little tenderness, and no signs of pus in the pelvis, electricity and pelvic massage have been praised, as favoring the absorption of the exudate, but in view of the difficulty there exists in making a diagnosis, such treatment must of necessity be surrounded by great dangers.

If all therapeutic measures fail, after a sufficient delay recourse must be had to the radical operation of salpingo-oophorectomy. It is preferable to delay operation until the subsidence of an acute attack, but when the severity of the symptoms are such as to lead to the conviction that a purulent salpingitis is immediately endangering life, no delay should be made, but radical measures resorted to at once, for the removal of the adnexa and possibly of the uterus. Salpingo-oophorectomy is also indicated in interstitial salpingitis, if the patient suffers much pain, and has repeated attacks of pelvic peritonitis.

Salpingo-oophorectomy. The appendages may be removed through the abdominal walls or through the vagina.

1. *Abdominal salpingo-oophorectomy.* The abdominal incision is made in the median line sufficiently large to allow the entrance of two fingers. The first and middle fingers are introduced into the abdominal cavity, the omentum and intestines pushed up, and the fundus of the uterus sought for. Passing the fingers outward along the tube to the ovary, they are both lifted up between the fingers through the abdominal wound. If there are adhesions they are cautiously separated, relying on the sense of

touch alone. If the points of adhesions are difficult to overcome, they may be lifted into the wound and separated there, or it may be necessary to enlarge the incision, so as to make the whole pelvis accessible to the eyes and hands. When the tube and ovary are lifted up, a pedicle needle, threaded with a strong silk or catgut ligature, is pushed from the front backward through the broad ligament, a half to three quarters of an inch under the ovary. After removal of the needle, the ligature is brought up over the tube, close to the uterus, and tied tightly, after which the ends are passed below the ovary, and sufficiently far away from it to allow for a pedicle, and again tied tightly. By this means the tube, ovary, and the included broad ligament are tied off, and may now be removed with a pair of scissors, taking care to take away all of the ovary, and as much as possible of the tube, while on the other hand sufficient pedicle should be left to prevent the ligature from slipping. After carefully watching the stump to make certain that the vessels are securely tied, the surface may be smeared with a little iodoform, or aristol, the ligature cut short, and the pedicle allowed to sink down into its normal position.

As to the treatment of the appendages of the other side, there is much difference of opinion; some authorities recommend their removal even if they are healthy, because they will very likely become affected later, while others recommend that an effort should be made to save them, even if found to be slightly diseased, particularly where offspring is much desired. If both appendages must be removed, it is almost as well to remove the uterus too. This organ is often the source of the infection, and besides, after the removal of the appendages it is useless, and may be the cause or source of a new infection.

Results. In a very large percentage the operation brings on the menopause at once, or after a few months. When menstruation continues, it may be due to the in-

complete removal of the appendages, to irritation of the stump, to disease of the uterus, or to the law of "persistence of habit." As a rule there is a discharge of blood for several days following operation, which is accounted for by the congestion caused by the ligatures. The sexual appetite may remain unchanged, increased, diminished, or may disappear altogether. In a considerable number of cases melancholia has developed. Even if the mental disturbance does not go so far as insanity, despondency and irritability are quite frequently observed.

Vaginal salpingo-oophorectomy presents the advantage that there is less shock, and less risk of causing a hernia, but it has the disadvantage that the field of operation is narrow and deep seated. When the diagnosis is uncertain, and when there are adhesions to intestine or omentum, it is much more difficult to cope with these difficulties through the vaginal route than by abdominal incision.

The vagina is opened by anterior or posterior colpotomy, or by both, and if more room is necessary, an incision in the median line may be carried from the posterior transverse incision as far down as the bottom of Douglas' pouch. The fingers are gradually worked up until they pass through the peritoneum. Adhesions may be now carefully broken up, after which the appendages can be brought down and ligated. The vaginal wound may be ligated in cases where there has been no local infection, otherwise it is best to lightly fill the wound with iodoform gauze, and subsequently the vagina.

Pyosalpinx signifies an accumulation of pus in a closed or cystic Fallopian tube. It is merely a tube, the walls of which show interstitial inflammation, with the abdominal opening obliterated by agglutination and firm adhesions of the fimbriæ, and probably the uterine opening also obliterated by inflammatory thickening, or by torsion of the tube. The closure of the openings permits of the

retention of secretions and exudations within the tube, and, as a result, it undergoes enlargement and distension from the presence of its contents. The greater enlargements occur as the result of closure of both ends of the tube, the lesser are found in conjunction with a free uterine end, the contents of the tube having some opportunity for escape into the uterus. The escape is either a constant leakage, or an intermittent discharge, brought on by direct contraction of the tube, or by indirect pressure.

Pyosalpinx is generally unilateral, but may be bilateral. In the commonest form there is a general enlargement of the tube, club-shaped at the outer end, and tapering gradually towards the uterus, or more or less convoluted. The diameter of such tubes may reach an inch or more. When there is an absence of constrictions, it may assume the appearance of a pear-shaped cyst, and attain the size of a normal uterus; rarely it may reach the dimensions of a foetal head. The pus contained in the sac is often mixed with blood, serum, or mucous, which accounts for such collection not presenting the active tendencies of collections of pure pus witnessed elsewhere. Collections of pus in a tube will often remain relatively quiescent for considerable periods of time, and may suffer partial absorption and inspissation, appearing ultimately as a pultaceous mass. The tendency, however, is for escape, the direction being most often along the canal to the uterus. Next in frequency, it tends to escape through the abdominal end of the tube, and least frequently by a combination of stretching and degeneration an opening may be made through the tube wall.

When the contents escape through the uterus, the tendency of the tube is to refill, and thus alternately emptying and refilling, the condition may exist for a long time, either ending in atrophy of the tube, or in permanent closure and the formation of a complete pus sac. Leakage from the abdominal end is not uncommon, each escape

being accompanied and followed, as has already been stated, by the phenomena of local peritonitis proportionate to the amount and specific virulence of the fluid. Leakage through the wall of the tube is less common, but should it occur at the upper and posterior surface, the favorite situation, there would be discharge of the tube contents into the general peritoneal cavity, accompanied by all the dangers which pertain to such an accident. The opening may occur on the under surface of the tube, between the layers of the broad ligament, through which the pus reaches the subperitoneal cellular tissue, where its further incapsulation is largely provided for. Fortunately most cases of pyosalpinx beget such an amount of local peritonitis about them as will ensure strong protecting peritoneal adhesions, and the occasional leakages only add to, and extend the adhesions, so that even though secondary foci of pus develop outside the tube, they are again held in check. It is in this way that pelvic abscesses are formed, and the further consideration of pus collections, originating in pyosalpinx, will be considered under that heading.

Hydrosalpinx. Hydrosalpinx is a cystic enlargement of the tube, in which the general outlines and dimensions of the organ are in the main similar to those found in pyosalpinx. It is usually an advanced stage of pyosalpinx, and represents a practical destruction of the tube. The walls are attenuated and may be so thin in places as to be translucent. The contents are serous, not purulent, and in many cases as limpid as water. It is found as a bilateral rather than a unilateral disease, and is rarely without the association of strong well organized adhesions. It is free from the aggressive action which characterizes pyosalpinx. It tends rather to quiescence, sometimes to intermittent discharges through the canal into the uterus, and ultimately to absorption and general atrophy, more particularly of the outer parts of the tubes.

Hæmatosalpinx. Like pyosalpinx, hæmatosalpinx has its seat in the ampulla, and has similar dimensions and form. Leaving aside that form already mentioned when speaking of atresia of the genital tract, there are two chief varieties.

The first and most frequent is apoplexy of the tube, a condition which may occur in the course of a catarrhal inflammation, or during an irregular menstruation affected by fatigue, cold, or pelvic or uterine congestion. The tube is about the size of the middle finger, the contents fluid blood and retained in the tube by closure of the abdominal opening which has occurred at some prior inflammation. The lesion is usually only temporary, the blood is reabsorbed, and the symptoms gradually subside.

The second variety represents a graver condition. There will probably be extreme dilatation of the tube, and an extremely thickened and infiltrated wall. On opening the tube it will be found filled with a syrupy, chocolate colored blood, or more often with a clearer liquid formed of a watery fluid and blood. Clots may form in layers on the walls, or in little fibrous masses lying free in the cavity. Various explanations have been offered as to their production. First, that there is originally disease of the inner surfaces of the tube, and from this a true hemorrhage occurs at each menstrual epoch. This blood coagulates, filling the ampulla. A second hemorrhage occurs with coagulation of its blood around the original clot. This process is repeated time and again, until large masses are produced, which in time soften in the centre, and lead to the conversion of the entire mass into a collection of blood debris. The second explanation is that it follows a pyosalpinx or hydrosalpinx, as the result of traumatism, or twisting of the pedicle or inner end of the tube. The third explanation presupposes a tubal pregnancy arrested in its development by the death of the foetus.

Tubo-ovarian abscess. When the inflammatory process extends to the peritoneum in cases of chronic salpingitis, it is sure to involve the ovary. The first effect will be thickening of the capsule, which in turn prevents the rupture of the ripe ovarian follicle. The tension produced gives rise to considerable disturbance and pain, and, as the enlarged follicles cannot discharge their contents, it necessarily follows that an ovary which has long been the seat of peri-oophoritis will be largely converted into

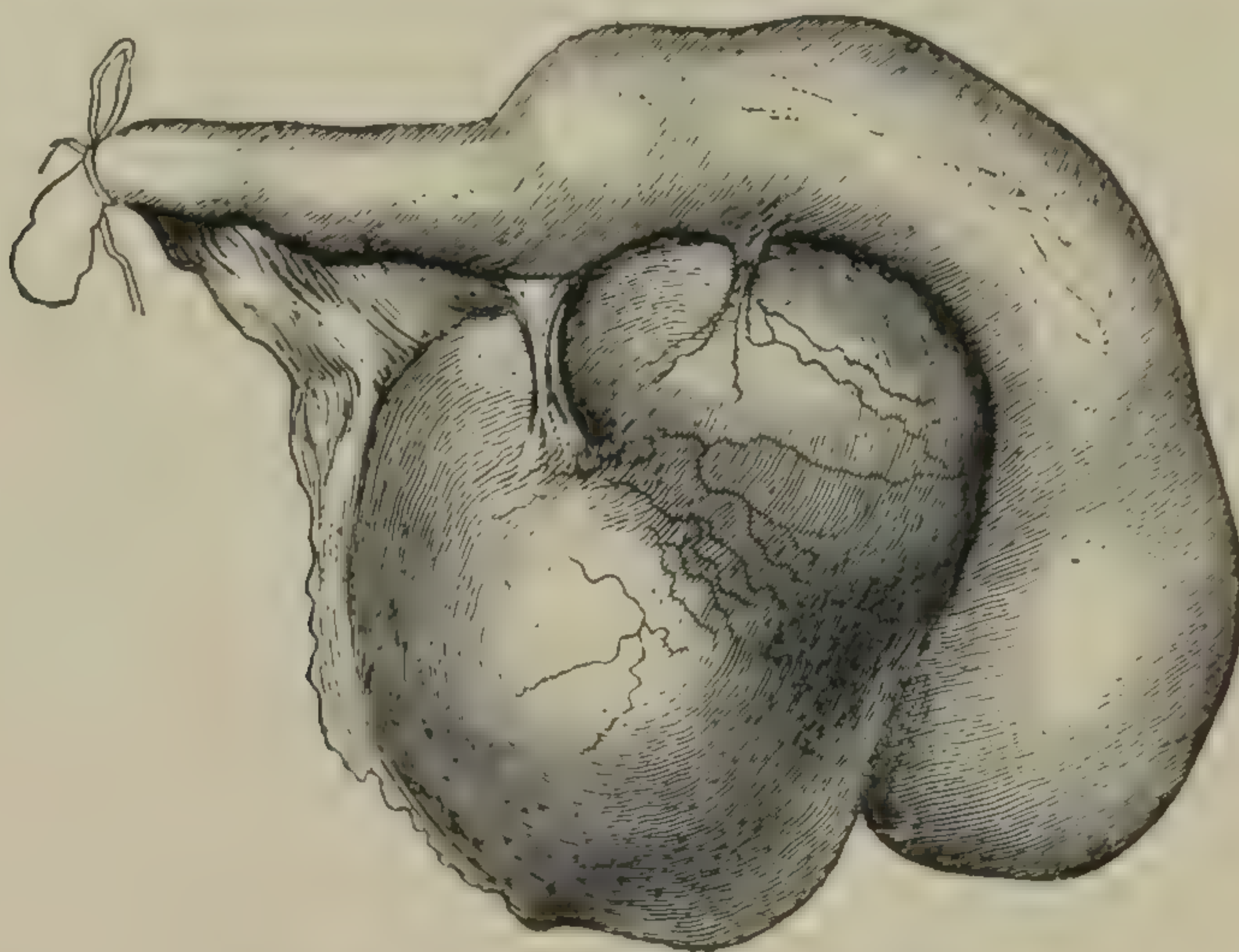


FIG. 94—Pyosalpinx and ovarian abscess.

cystic spaces (cystic ovaritis), two or more of which may become confluent, and form a cyst the size of a walnut. As such a cyst enlarges, it not unfrequently comes in contact with a dilated pus-containing ampulla, and by mutual contact adhesions form and absorption takes place between their walls, and the cyst becoming infected, a tubo-ovarian abscess is the result.

Atrophy of the tube may result from the destructive action of pelvic suppuration. After a partial atrophy of the walls by cystic degeneration, a rupture and discharge of the contents may be followed by cicatricial contraction and partial obliteration. Traces of mucous membrane and muscular fibre may remain, but the chief part consists

of connective tissue so contracted as to resemble a fibrous cord.

Symptoms. The clinical picture does not materially differ from those drawn of non-cystic salpingitis. There are the same pains, and the same menstrual disorders. At times there may be a sudden flow of a certain purulent, serous, or bloody fluid following an attack of colicky pains, occurring at irregular intervals of a month or six months. Unless there is leakage, or rupture into the abdominal cavity, no marked constitutional symptoms may be present, and it is possible for a woman to carry about with her two sacs filled with pus, without any serious phenomena, or even seeming to suffer from their presence. Between the initial period of formation and the final period of inflammation of surrounding parts, and efforts at spontaneous evacuation, pyosalpinx passes through a torpid and latent phase, during which the rational symptoms seem to be exactly similar to those of chronic salpingitis, and the physical signs in no wise different from those of hydro-salpinx and hæmatosalpinx.

Two groups of symptoms are really characteristic; the pain which directs attention to the uterine appendages, and the local examination which results in the finding of a tumor at one or both sides of the uterus. Physical examination should be undertaken with the utmost care, as serious and even fatal accidents have been caused by too rough handling of a pyosalpinx. By bimanual examination, a pear-shaped body can be made out, extending from the side of the uterus, and connected to it by a slender pedicle which can scarcely be reached. When the tumor is bilateral, it gives the sensation as if "a wallet had been thrown over the uterus, saddle-bag fashion." Fluctuation is rarely felt, but pain is always caused by the examination. Sometimes the tumor falls down into Douglas' pouch, giving in that region the sensation of the presence of an elastic or fluctuating globular mass, incor-

porated with the posterior surface of the uterus. It is usually purulent, and is at first free, but gradually becomes so adherent to the surrounding parts that it is transformed into a veritable pelvic abscess which cannot be enucleated.

Diagnosis. Appendicitis is distinguished by the high position of the exudate, by the seat of the pain being abdominal rather than pelvic, and radiating towards the umbilicus, rather than into the hips, or down the thighs. The attack is generally attended by disorders of the stomach or bowels, and with much greater tendency to nausea and vomiting, and there are usually absent those symptoms specially referable to the genital organs.

Pyosalpinx is to be suspected, if the dilatation of the oviduct follow gonorrhœal or puerperal infection, and if the tumor be closely adherent. Pyosalpinx is frequently, and hydrosalpinx usually double, while hæmatosalpinx is unilateral. While the tumor is still movable it may be mistaken for a small ovarian cyst, and especially for an intra-ligamentous cyst. The latter however is soft, fills the ligament flush with the uterus, and is thus without a pedicle. A parovarian cyst is softer, and has no traceable connection with the uterus, and no adhesions. The differential diagnosis from tubal pregnancy is often difficult during the early months, but there will be the absence of those characteristic symptoms to be referred to later on. It may be mistaken for a pedunculated intra-peritoneal fibroid, but a fibroid is hard, insensitive, and can easily be traced to the uterine wall, while the adnexa may possibly be palpated on either side.

Treatment. As soon as the diagnosis of a cyst of the tube is established, salpingo-oophorectomy must be performed. As said before, operative interference should not be undertaken during an acute attack, but if it be of so serious a nature as to threaten general peritonitis, or if

there be danger of rupture of the pyosalpinx, thoughts of delay must not be entertained, as operative interference is the only way to save the patient's life.

CHAPTER XXVII.

PELVIC INFLAMMATION.

Much confusion has existed for a long time in the classification and complete understanding of diffuse inflammations of the pelvis, and, as a result, a variety of names has appeared in the literature of pelvic inflammation, intended to represent the conditions which, under varying circumstances, seem predominant. The intimate relations existing between the Fallopian tubes, ovaries, peritoneum, cellular tissue, and lymphatics, compels an almost constant intermingling of the lesions of inflammation affecting them, and consequently under the heading "pelvic inflammation," recent authorities are disposed to include all those inflammatory diseases which involve these structures, treating them as if a single disease. As has already been pointed out, a pyosalpinx rarely exists except it is complicated by pelvic peritonitis, and in all probability by pelvic cellulitis, and the abscesses which form are usually the result of more advanced stages of those conditions.

There are, however, two forms of inflammation occurring within the pelvis, which, from a clinical standpoint at least, deserve separate consideration, and the phrase "pelvic inflammation," as here used, is to be understood to include the two affections, *pelvic cellulitis* and *pelvic peritonitis*. Inflammation of the several viscera contained in the female pelvis are described under their several headings, and will only be referred to as far as they are concerned in the pathological processes that lead to the two diseases just named.

PELVIC CELLULITIS.

Pelvic cellulitis, also known by the synonyms *parametritis* and *peri-uterine phlegmon*, is an inflammation of the pelvic connective tissue. Such inflammation may be *primary* or *secondary*, that is, it may originate in the connective tissue itself, or in one of the neighboring structures, and reach the connective tissue by extension.

The primary form, or that which will now be considered, is an acute infective disease, and differs in no respect from acute inflammation of the connective tissue in any other part of the body. Chronic pelvic cellulitis is always a secondary affection complicating inflammation of some other part.

Etiology. Primary pelvic cellulitis is always a result of septic infection. Its most common source is the absorption of septic matter owing to laceration of the cervix uteri, or of the upper part of the vagina, during labor. Other sources of infection are the various surgical manipulations practised on the vagina and cervix. The lymphatics are the channels by which the poison is conveyed to the connective tissue, hence there is always a certain amount of lymphangitis associated with cellulitis. It is highly probable that the lymphatic glands are also generally implicated, particularly the lumbar which receives the lymphatics from the broad ligament and body of the uterus, and the hypogastric or pelvic glands which receive the lymphatics from the cervix and upper part of the vagina, and as such have been described as *pelvic lymphangitis*.

Pelvic cellulitis occurs with or without formation of pus. In the latter case there is an exudation of coagulable lymph with œdema into the tissue of the infected area, which at first produces increase of bulk without manifest alteration of consistence. Very soon the inflamed tissue becomes stiff and indurated, and, at a later stage, seems as

hard as cartilage. This inflammatory exudation may gradually undergo absorption, and eventually disappear, or it may terminate in suppuration, with the formation of a pelvic abscess. Usually there is a single abscess cavity, but occasionally several are formed.

Symptoms. Pelvic cellulitis is often ushered in by a chill or rigor. In puerperal cases this usually occurs on the second or third day after delivery, but it may be later. In non-puerperal cases it seldom exceeds a day or two. The temperature rises, and the pulse becomes quickened. Severe pain is seldom present, unless the inflammation extends to the neighboring peritoneum. When suppuration has occurred, the most marked symptom is progressive emaciation, associated with pallor, or a peculiar sallowness of the skin. There is complete anorexia and the bowels are usually constipated, though occasionally there is diarrhœa.

In the early stages, local examination does not give much information. After the lapse of several days, the exudation in the tissue of the affected area becomes densely hard. When the infection has occurred at the upper part of the vagina, or through the cervix, the latter loses its normal mobility, and the supra-vaginal tissues on the affected side are tender, and more or less hard and unyielding. It is seldom that both sides of the pelvis are uniformly affected. In the majority of cases the inflammation spreads laterally along the base of the broad ligament, and then passes forward to the tissues beneath the reflection of peritoneum on the anterior abdominal wall, and the induration produced there takes the form of a broad band lying along the upper border of the inner portion of Poupart's ligament. Sometimes the exudation spreads upward and outward from above Poupart's ligament into the iliac fossa, interfering with the action of the psoas and iliacus muscles, and causing the patient to keep the thighs flexed. In some instances the inflamma-

tion passes backward instead of forward, producing an exudation in the tissues of the utero-sacral ligament, in the tissues surrounding the rectum, and in those beneath the peritoneum lining the posterior pelvic wall. When the body of the uterus is the starting point of the cellulitis, and the broad ligament the seat of the exudation, bimanual examination will reveal a hard, smooth, flattened, slightly movable tumor by the side of the uterus, and inseparable from it.

Pelvic abscess. When a pelvic abscess forms, the situation of the abscess, and the position where it may be expected to point, will depend upon the direction in which the inflammatory exudation has extended. When the inflammation is seated in the tissues at the base of the broad ligament, and passes forward, forming an area of induration above Poupart's ligament, the presence of suppuration is manifested by œdema in the skin over the indurated area which pits on pressure; by the signs of deep seated fluctuation, and by the eventual pointing of the abscess a little above Poupart's ligament. When the inflammation extends backward, and suppuration occurs, the abscess is formed beneath the peritoneum covering the back of the pelvis, and, as free access is difficult, burrowing is almost inevitable. Extension into the iliac fossa and the loin is more particularly apt to take place when the posterior pelvic wall is the seat of an abscess, the abscess pointing either at the iliac crest or above it. Sometimes the pus leaves the pelvis by the sciatic notch, and follows the course of the gluteal vessels. In other instances it may make its appearance in Scarpa's triangle. Pelvic abscesses may, though very rarely, discharge themselves into the rectum, vagina, or even the bladder. The usual time for an abscess to point is from the seventh to the twelfth week.

Diagnosis. Pelvic cellulitis may be mistaken for hæmatoma of the broad ligament, or a fibroma of the

uterus. The history of the case, and the absence of symptoms of severe illness will, as a rule, serve sufficiently to distinguish a hæmatoma from an inflammatory condition. Hæmatoma occurs suddenly, either from rupture of a pregnant tube, or of a varicose vein in the broad ligament. In either case the onset is usually marked by sudden pain and faintness, and usually also by an attack of vomiting. In the case of rupture of a pregnant tube, one or two menstrual periods will have been missed, and attacks of pain will have occurred in the lower part of the abdomen, generally at one side, with slight irregular hemorrhages from the uterus. It must not be forgotten, however, that a hæmatoma may become infected and undergo suppuration, when the symptoms will be similar to those of pelvic abscess due to cellulitis. In regard to myoma, no great difficulty should arise, unless developed laterally between the layers of the broad ligament, and complicated by an attack of localized peritonitis. The mobility of the cervix, and the absence of pain and tenderness, as well as the absence of the constitutional symptoms attending cellulitis, should readily diagnose it from the latter condition.

Prognosis. Except in those severe forms in which cellulitis forms only a part of a general septic process of the most acute and fatal type, the disease usually terminates in recovery. As soon as the fever subsides the exudation begins to undergo absorption, and will have entirely disappeared in a few weeks. Should the fever not subside in the course of five or six weeks, suppuration has probably occurred, and the duration and progress of the illness will then largely depend on the direction that the pus may take in its efforts to reach the surface. In the large majority of cases the abscess will point above Poupart's ligament, where it can be opened. These cases almost invariably do well. In the rarer cases, where suppuration occurs at the back of the pelvis, the pus is longer in reaching the surface, and is apt to burrow.

Such cases often last a long time and are very trying upon the patient.

Treatment. Remembering that this disease which produces such wide spread destruction, and often dangerous and even fatal results, has its origin in septic infection, the necessity for strict asepsis, or surgical cleanliness, becomes fully apparent. If freedom from infection could be ensured to every parturient woman, and a similar freedom extended to every woman who is submitted to vaginal examination and manipulation, pelvic cellulitis, as a primary affection, would entirely disappear. It is doubtful whether, when once an attack of pelvic cellulitis has been initiated, it is possible to modify to any great extent the course of the disease, hence strict care should be taken not to do harm by meddlesome interference or frequent examinations.

The state of the bowels should receive the most careful attention, and a regular course of aperient medicine should be kept up. A mild febrifuge mixture, containing liquor ammoniæ acetatis, or citrate of potash, may be administered. The tendency to emaciation calls for generous dietary, and the patient's appetite should be tempted by every means available. When induration and pain are felt in the pelvis, hot fomentations kept in place by a bandage, or hot water bottles, should be applied to the lower abdomen. Vaginal douches of hot water should be administered frequently, after which a boro-glyceride tampon, or one saturated with a ten-per-cent. solution of ichthyol in glycerine may be inserted in the vaginal fornix. When there are evidences of suppuration, quinine may be administered, and, if necessary, the system supported by stimulants. The abscess should be opened as soon as fluctuation is detected, or there is the faintest indication of pointing, and treated on general principles. The point for incision, whether intra-vaginal or external, must depend largely upon the direction which the abscess

seems to be taking, and the degree of pointing in that direction.

Chronic pelvic cellulitis does not exist as an independent disease, or as a sequel to the acute form, but it occurs occasionally as a secondary result of purulent salpingitis. It only involves the parts immediately contiguous to the inflamed structures, and never gives rise to the broad band of induration in the lower part of the abdomen so common in the primary affection.

PELVIC PERITONITIS.

Pelvic peritonitis, also known by the synonyms *perimetritis*, *peri-salpingitis*, and *peri-oophoritis*, is an inflammation of that portion of the peritoneum situated within the pelvis. It is much more common than pelvic cellulitis. In a large majority of cases, if not in all, it is an infective process, due either to the presence of micro-organism or to their chemical products.

Etiology. Pelvic peritonitis, as now understood, probably never occurs otherwise than as a result or complication of some preexisting disease within the pelvis. Not infrequently, however, it is the first indication of the presence of such disease, for the symptoms of peritonitis are for the most part acute, and of a character to compel attention, whereas those of the original disease are often so slight as to be scarcely noticeable.

Salpingitis and its complications. In the vast majority of cases pelvic peritonitis is the result of inflammation of the Fallopian tubes. The methods of infection of the pelvic peritoneum, by means of the tubes, and the effects produced, immediate and remote, have already been considered when speaking of salpingitis.

New growths. Peritonitis may result from twisting of the pedicle of an ovarian tumor, or by the presence of any new growth in the pelvis, and it is in this way in ordinary cystic disease adhesions are formed.

Septicæmia. When septic infection of a severe type follows abortion, parturition, or surgical manipulations, giving rise to diffuse septic infection of the pelvis, the pelvic peritoneum will also be involved.

Pelvic cellulitis. Pelvic peritonitis may result from the spread of the inflammatory process from the pelvic connective tissue, more particularly when it is attended by suppuration.

Disease of the vermiform appendix is not to be forgotten. Occasionally the appendix is found lying within the pelvis, and, when investigating a case of pelvic peritonitis, it is well to remember that it may arise from disease of that organ.

Pathology. The earliest change produced in the peritoneum is hyperæmia, with cloudy swelling of the endothelium. The membrane loses its normal, smooth, shiny appearance, and becomes dull, dry, and slightly roughened. Plastic lymph is then poured out on the surface, which leads to rapid formation of adhesions between the adjacent surfaces. In addition to the lymph effused, there is also an effusion of serum which tends to accumulate, principally in Douglas' pouch, but it also tends to form collections of fluid in different parts of the pelvis, where spaces intervene between the adhesions. One of the earliest results of the adhesive process is to roof in the contents of the pelvis from that of the general peritoneum. The intra-peritoneal collections of serum are absorbed, but the adhesions formed continue for a long time, and many of them become permanent, with the result of producing more or less serious interference with the functions of the viscera involved. When the disease causing the peritonitis is purulent, the peritonitis is also apt to be purulent, and as a result, instead of accumulations of serum amongst the adhesions, collections of pus are formed—intra-peritoneal abscess.

Symptoms. An attack is characterized by pain in the lower part of the abdomen, sudden in the onset, and at first severe in character. There is rise of temperature, rapidity of pulse, and intestinal disturbance, indicated by vomiting and local or general distension. After the acute pain has subsided, movements of the body are painful, owing to the tenderness of the inflamed parts. There is usually constipation, and pain preceding defecation and during micturition. In subacute and chronic cases, pain in the back, and inability to undergo physical exertion, are the most common and may be the only symptoms, while trifling causes, such as slight over exertion or exposure to cold readily provoke localized acute attacks. Such recurrent attacks are especially apt to occur when the chronic pelvic peritonitis is kept alive by the presence of pelvic suppuration, and serves as a better guide to the diagnosis of pus in the pelvis than does the temperature. In course of time, patients become ill and emaciated, and entirely incapacitated for work of any kind, and may even become invalided.

During an acute attack of pelvic peritonitis the patient lies on the back, usually with the knees drawn up. The lower part of the abdomen is extremely tender to the touch, and the walls over the area affected more or less rigid. On vaginal examination, the parts at this stage will be too sensitive to allow of a satisfactory investigation. In there be any depression in the vaginal vault, it will be central and not lateral, owing to the filling up of Douglas' pouch. There may be tenderness and a sense of resistance on pressing the fingers upwards into one or both lateral fornices, but it will not be possible to map out any definite swelling until the acute symptoms have subsided. After this has occurred, a careful bimanual examination will probably reveal an inflamed Fallopian tube as a fixed, irregular, tender, sausage-shaped swelling, and gradually increasing in size as it extends outwards

from the uterine cornu. As the patient recovers from the immediate effects of the attack, the hardness of the peritoneum gradually disappears, and the outline of the adherent appendage more readily made out.

Diagnosis. *Pelvic cellulitis.* Pelvic cellulitis is a much rarer disease than pelvic peritonitis. Its origin is exclusively septic, never gonorrhœal or tubercular, and is essentially a disease of the puerperium, or one following surgical manipulation. Cellulitis, when uncomplicated, is unattended by pain, or at any rate by severe pain. In both diseases there is swelling in the lateral regions of the pelvis, but in cellulitis the swelling is usually unilateral, smooth, uniform, attended with fixation of the vaginal vault, and of stony hardness. In peritonitis it is more apt to be bilateral than unilateral, and instead of being smooth and of uniform consistence, is irregular in outline and unequal in consistence. In cellulitis the cervix is apt to be surrounded by a hard thick collar, in which it is immovably set, whilst in peritonitis it is not present, and the impairment of mobility of the cervix is never so complete. In cellulitis the rectum will often be felt surrounded wholly, or partially, by a belt of exudation of stony hardness, fixing the coats of the bowel at that part, and narrowing the cavity of the canal. In peritonitis enlargement will be in Douglas' pouch, and will be less hard, and will not affect the mobility of the walls of the bowels to the same extent. When cellulitis has its seat in the broad ligament, bimanual examination will reveal a smooth, hard, flattened tumor by the side of and continuous with the margin of the uterus. This tumor can be moved backward and forward within certain limits. The swelling caused by the inflamed and adherent appendages in pelvic peritonitis is, on the contrary, of irregular contour, and is not continuous with the uterus, but on a plane behind it, and quite fixed.

Pelvic hæmatocele. The diagnosis will largely depend upon the clinical history. As pelvic hæmatocele, in a majority of cases, is a complication of tubal pregnancy, there will usually be a history of early pregnancy, and of a sudden attack of pain accompanied by great faintness. The patient will have a blanched appearance, or that of shock. The effusion is at first fluid, but soon acquires a doughy consistence, and later becomes diminished in bulk and harder.

Prognosis. The prognosis in pelvic peritonitis is much less favorable than in pelvic cellulitis. The mortality is higher, and the after effects in those who recover are apt to be much more troublesome. The damage done to the uterus, ovaries, and tubes during an attack frequently produces sterility. Displacements of the uterus are apt to follow, together with the symptoms induced by such conditions, and the normal action of the bowels are apt to be disturbed.

Treatment. *Preventative.* Inasmuch as the large majority of non-purulent cases of pelvic peritonitis is due to gonorrhœal salpingitis, care should be taken to destroy gonorrhœal infection as soon as discovered, and before it has gone beyond the reach of local applications. Strict attention to surgical cleanliness in every form of manipulation will often prevent the occurrence of salpingitis, the forerunner of pelvic peritonitis. In those who have once been the subject of pelvic peritonitis, it is important to avoid such causes as are likely to provoke a relapse, such as exposure to cold during the menstrual period, over exertion, prolonged standing, and inattention to the bowels.

The *medical treatment* consists in very much the same measures as those recommended for the relief of pelvic cellulitis. Pain being a most distressing symptom must be relieved by small doses of morphia, and the tendency to the formation of scybala prevented by the careful use

of enemata. Should the state of the pulse indicate it, stimulants in the form of brandy or whiskey should be given in defined and measured doses, and the effects carefully watched. Tendency to collapse should be met by the application of hot water bottles, and by hypodermatic injections of strychnia.

Surgical measures, when necessary, are best deferred until the acute symptoms have subsided, and until an opportunity has been afforded of making a thorough bimanual examination and arriving at a correct diagnosis. If it is a first attack, and the symptoms such as to lead to the diagnosis of non-purulent inflammation of the appendages, operative interference should not for a moment be recommended. If, on the other hand, the patient has had several attacks previously, and the swelling has attained such dimensions as to make it fairly certain that pus is present, nothing but the operative measures advised when speaking of salpingitis will be of any avail.

CHAPTER XXVIII.

DISEASES OF THE OVARIES.

Malformations. One or both ovaries may be congenitally absent but such a condition is very rare. When it does exist, it is generally only a part of a complete want of genital development manifested by the parts making up the vulva, vagina, and uterus. More common than absence is rudimentary development, in which the ovaries may or may not contain Graafian follicles. The gland itself may be of nearly normal size and in a normal situation, but the gland contents, the Graafian follicles and ovules may be absent. Such conditions may be found in connection with a normal uterus, but most commonly they are found associated with arrest of

development of that organ. A diagnosis in such cases is extremely difficult, but the condition may be presumed when the ovaries cannot be palpated bimanually, combined with want of development in the other genital organs, with absence of the usual signs of the menstrual crisis, and with lack of general constitutional vigor and development.

The ovaries of new-born children may be twice their normal size, a condition which may be due to uniform enlargement of its constituent parts, or to foetal inflammation resulting in a preponderance of connective tissue, and a partial or total disappearance of the Graafian follicles. Accessory ovaries immediately joining the normal ovary, and included usually within the same peritoneal investment, have been found. The ovary may likewise be constricted so that it consists of two practically independent parts. A true supernumerary ovary, far removed in station from its fellow, is extremely rare.

DISPLACEMENTS.

Congenital displacements of the ovaries are very rare. In the early embryo they are situated, like the testicles, in close relation with the kidneys, but soon after birth they are found to occupy a position in the true pelvis. Only in extremely rare instances have ovaries been found retained in their original relations with the kidneys.

Congenital inguinal hernia of the ovary is also rare, but when it occurs, it is generally due to deficient development of the round ligament, by which the ovary, tube, and sometimes one horn of the uterus, are pulled through the canal of Nuck. There are usually no symptoms until menstruation sets in, when there may be much disturbance of that function. The only treatment consists in extirpation.

Acquired displacements of the ovaries are not uncommon. Any influence which increases their weight, or

draws upon them directly, or acts upon them by traction, may cause them to leave their position, and sometimes to such an extent as to pass out of the pelvis in the form of a hernia.

Causes. Displacement of the ovaries may be brought about by any causes which will increase their weight; such as inflammation, hypertrophy, or cystic degeneration. They may be acted upon by contraction of effused lymph resulting from pelvic peritonitis, or by contraction of the ovarian ligaments drawing them out of place. It may be brought about by displacements of the uterus, more particularly retroversion and retroflexion, or by insufficient support from below, especially when it is the outcome of a weakened or ruptured perineum.

Displacements may be subdivided into *intra-pelvic* and *extra-pelvic*, according to whether the ovary is found within, or outside the pelvis.

Intra-pelvic displacement, or prolapse of the ovary, is a common disease, and one of considerable practical importance. When the ovary becomes displaced it sinks backward, downward, and inward, first upon the retro-ovarian shelves, and next into Douglas' pouch, describing in its descent an arc of a circle.

Symptoms. The symptoms will vary according to the causes which have induced the displacement, and to the possibility of its return to its normal position. Ovaries prolapsed behind the uterus manifest themselves by more or less severe, or constant pain in the lower part of the back, usually referred to the sacral or rectal region, and intensified by the passage of hardened feces or by the act of coition. There is a further sensation of dragging or bearing down, and when the ovary is adherent these symptoms are usually aggravated.

The *diagnosis* is usually made by vaginal examination. The prolapsed ovary can readily be touched in its abnormal position, giving a peculiar sensation of faintness and

nausea when pressed upon. It might be mistaken for a swollen tube, but the latter is more sausage-shaped. A small pedunculated fibroid is harder and not sensitive, while scybala may be indented or crushed without much pain, and may be removed by enemata or cathartics.

Treatment. The treatment consists in replacing the ovary, if it is movable, by digital manipulation, or by posture in the genu-pectoral position, and, after replacement, its return to the pelvic cavity prevented by some suitable support, such as a Thomas' retroflexion pessary, or astringent balls or tampons of cotton packed behind the cervix. If a retro-displacement of the uterus exists, the reposition of that organ, together with the ovaries, and its retention by a suitable pessary will usually suffice. If the ovary is adherent it will be necessary first to endeavor to stretch and break up adhesions. This may be done by pelvic massage, and by packing the posterior fornix of the vagina, while in the genu-pectoral position, with cotton balls, the first few inserted being impregnated with boroglyceride, or a ten-per-cent solution of ichthyol in glycerine. If these measures fail recourse may be had to radical methods. If there are no adhesions and the uterus is freely movable, Alexander's operation may be performed; if otherwise cœliotomy must be undertaken in order that the adhesions may be broken up, after which the uterus should be retained in place by ventral fixation.

Extra-pelvic displacement, or hernia of the ovary. The ovary may pass through the same openings as other herniæ, but all but two forms are exceedingly rare.

Inguinal. The passage of the ovary into or through the inguinal canal can only occur when the tube and infundibulo-pelvic ligament are unusually relaxed and elongated. When such a condition exists hernia may be produced by a fall or similar violence, and the ovary, in its abnormal place, may become inflamed, or undergo cystic or cancerous degeneration.

The *diagnosis* may be made by the presence of a tumor in the inguinal region corresponding in shape to that of the ovary, and producing a peculiar sickening sensation when pressed upon. Bimanual examination reveals absence of the ovary from the pelvis and tilting of the corresponding uterine cornu to that side, while backward and forward movement of the uterus causes the tumor to move.

The hernia may be reduced by taxis, and held back by the application of a suitable truss. Herniotomy may be necessary to relieve the imprisoned ovary, and when performed may be followed up by a radical operation to secure permanent results, or by extirpation of the ovary if it is found to be diseased.

Crural. The ovary may make its way through the crural ring into the crural canal. The same symptoms and treatment are applicable in this variety as in the former.

HYPERÆMIA AND HÆMATOMA.

Hyperæmia of the ovaries occurs to a considerable extent during each menstrual period, and often just previous to, and during coition, but should hyperæmia be kept up for any length of time, or is frequently repeated, it will result in persistent dilatation of the vessels, and some serous effusion into the stroma; and in more severe cases hemorrhage into the Graafian follicles may take place. The hemorrhage may be confined to one follicle, or it may occur in many. When there are many follicles affected, rupture of their septa may take place, producing hæmatoma, of a size varying from a pea to a walnut, or even larger.

Hemorrhage into the stroma is apt to assume the form of numerous minute extravasations. The blood may be completely absorbed, or remain as a coagulum, or as a mass of tarry fluid. The fluid part may be absorbed altogether, leaving a granular pigment, or the solid parts

may be absorbed, so that only a cyst filled with serous fluid remains, or suppuration may set in. An extensive hemorrhage may cause rupture of the ovary, and the blood pouring into the peritoneal cavity or penetrating between the two layers of the broad ligament, will form a hæmatocele.

Etiology. It may be due to anything which will produce venous stasis, such as masturbation, venereal excesses, uterine displacements, and sedentary habits, or it may arise from causes which produce a disordered condition of the blood, such as severe burns, phosphorus poisoning, scurvy, typhoid fever, or septicæmia.

Symptoms. A patient affected with hyperæmia of the ovary is likely to suffer from menorrhagia, and accompanying it there will be pain in the region of the ovaries and extending down the thighs, and sometimes neuralgia of the breasts. Hemorrhage into the ovary may take place without giving rise to any symptoms. If the collection is large, it causes severe pain, and even nausea and vomiting, and on examination the ovary will be found enlarged. Hyperæmia and hæmatoma may be diagnosed, if, in a healthy person, one or both ovaries suddenly become enlarged and tender without fever. In those who have been affected with blood dissolution, hæmatoma may be inferred if the patient is seized with ovarian pain, and a movable tumor can be felt in the pelvis.

Treatment. In hyperæmia, rest in bed is demanded; but to be complete, physiological rest must be secured as well. The general health should be improved, suitable tonics administered, and the bowels properly regulated. Some form of local treatment for the purpose of reducing general hyperæmia should be instituted, such as occasional counter-irritation over the lower abdomen by means of tincture of iodine or blisters, by hot vaginal douches, and by the use of ichthyol or boro-glyceride tampons. Later the patient may be allowed to return to

out door exercise, still keeping up the local and general treatment, but rest in bed must be insisted upon during each menstrual period. Should an acute attack occur at any time, the patient should at once be put to bed, an ice bag placed over the hypogastric region, and a dose of morphia administered to relieve the pain. If the ovaries have suffered in structure, the result of prolonged hyperæmia, or from repeated attacks, they should be removed.

OOPHORITIS.

Oophoritis, or inflammation of the ovary may be either acute or chronic.

Acute oophoritis. The inflammation may begin on the surface, *peri-oophoritis*; in the anterior, *interstitial oophoritis*; in the follicles, *follicular oophoritis*; or in the stroma, *inter-follicular oophoritis*. As a rule both organs are involved.

Etiology. Acute oophoritis is infrequently found outside the puerperal state. It may, however, be caused by hyperæmia and hæmatoma, or by any of the causes mentioned as liable to produce that condition; or by a sudden suppression of the menstrual flow. It may follow minor operations, such as the use of the sound, incision of the cervix, or trachelorrhaphy. From proximity of the ovary to the abdominal end of the tube, inflammation of the latter necessitates an almost constant implication of the ovary, *peri-oophoritis* being here the first form presented. Oophoritis may however occur quite independently of salpingitis. The lymphatics leading from the ovary connect in the meshes of the broad ligament with those coming from the upper part of the uterus, and it is thus easy for pathogenic germs to reach the ovary through those channels and infect them, without the presence of salpingitis. Interstitial oophoritis is the form here presented.

Whether the initial lesion begins within or without the organ, the results will generally be the same, for by transmission through the lymphatics outside implication will extend to the interior, and inside implication to the exterior. When the disease begins as a peri-oophoritis the surface will be found covered with a serous, plastic, or purulent exudation, in accordance with the grade of inflammatory action present. The ovary will be enlarged, and in the plastic and serous types, the cortex will be more or less infiltrated with small round cells, similar to inflammatory processes in other organs. If the type of inflammation be purulent, pus cells will predominate. Beginning as an interstitial process, the same elements pervade the organ, the predominance of the simpler inflammatory elements, or those indicative of suppuration, being governed by the presence or absence of septic elements. The Graafian follicles in all cases suffer changes kindred to those going on around them. There is turbidity of the liquor folliculi, with softening and disintegration of the membrana granulosa, and the ovum.

Course. In the absence of purulent infiltration, it may terminate in resolution, or in connective tissue sclerosis leading to atrophy, or the follicles may be converted into cysts, the ova and the membrana granulosa undergoing fatty degeneration. Purulent infiltration leads to the development of abscesses, coalescence of which may convert the ovary into a complete pus sac, nothing remaining but the tunica albuginea. These pus sacs may become encysted, but the rule is, a continuance of suppuration until the pus makes its way through the tunic, when the course will be similar to escape of pus from the tube.

Symptoms. Often the symptoms are masked by those of the disease which produced it. The ovarian region will be the seat of a burning pain radiating down to the knee, and to the bladder and rectum, and occasionally there will be reflex pain in the breast, and not infrequently

nausea and vomiting. By bimanual examination it is possible to feel the ovary enlarged and exceedingly tender to the touch. When an ovarian abscess has formed, it will give rise to symptoms similar to the formation of pus elsewhere, and when felt, a sensation of fluctuation may possibly be made out. It is seldom possible to make a certain diagnosis. An inflamed tube or a pyosalpinx is sausage-shaped when palpated, an inflamed ovary or ovarian abscess is round. Pelvic abscess is situated lower down and is absolutely immovable.



FIG. 95.—Ovary with many dropsical follicles (Leopold).

Treatment. The patient must be kept quiet in bed, with an ice bag over the affected side, and the bowels kept relaxed by means of saline aperients. Pain is to be combated by means of morphia in some form. If the symptoms point to the presence of pus, it is to be removed either by abdominal or vaginal oophorectomy.

Chronic oophoritis represents certain changes brought about in the ovary the result of repeated attacks of congestion or of acute inflammation, or it may be a chronic process from the beginning. The common changes which occur are *atrophy* and *cystic degeneration*. *Atrophy*

is most marked in conjunction with adhesions, which, by compressing the ovary, increase the sclerotic changes induced by the acute interstitial form. The whole organ may be converted into a small mass of connective tissue, with almost entire disappearance of distinct formation. In the *cystic form* the albuginea is thickened, and the organ filled with cysts intermixed with comparatively normal follicles. The cysts are transformed follicles with thickened walls surrounded by indurated tissue, the ova and membrana granulosa having undergone fatty degeneration and absorption, leaving merely limpid fluid. In other cases the cysts may contain a gelatinous or colloid material. Some of these cysts may be so large as to involve the whole ovary.

Etiology. Chronic oophoritis is much more common than the acute form, and is often the result of, or follows acute inflammation. A displaced ovary strongly predisposes to it. It is most frequently due to puerperal or gonorrhœal infection, while venereal excesses, masturbation, the abuse of alcohol, and syphilis are strong factors in its production.

Symptoms. The symptoms are often masked by surrounding inflammation. The patient complains of pain in one iliac fossa, or if both ovaries are affected, as is often the case, in both fossæ, the pain often extending to the rectum, bladder, hips, and down to the knees. The pain is increased at the approach of the menstrual period and during coitus, especially if the ovary is prolapsed. Standing or walking for even a short time gives great fatigue. Menstruation is often irregular and profuse, but in the atrophic form there may be amenorrhœa. Leucorrhœa is a common accompaniment, and often the digestive and nervous system suffer to a greater or less extent. On examination it is extremely difficult to say whether a mass felt through the roof of the vagina is an ovary or tube.

Sometimes the enlarged and prolapsed ovary can be made out by its globular form and extreme tenderness.

Treatment. The management of chronic oophoritis coincides in most respects with that described for chronic salpingitis, and when the case has been seen early, treatment may be of great benefit, but when degenerative changes have taken place to any marked extent, it will be readily understood that no immediate benefit can be derived. A displaced ovary, or retroverted uterus should be restored to its normal position and retained there. Hot vaginal douches and medicated tampons often give much relief from pain, and absorption of inflammatory material may be promoted by painting the vaginal vault with tincture of iodine. Notwithstanding local and general treatment, carried out methodically and persistently, in many cases nothing short of an operation for the removal of the diseased structures will be of benefit, and should be recommended before the patient's health commences to break down from the continued strain on the nervous system.

CHAPTER XXIX.

DISEASES OF THE OVARIES CONTINUED.

NEOPLASMS.

From a histogenitic point of view tumors of the ovaries have been divided into neoplasms of connective tissue origin, and epithelial neoplasms. The first group, *desmoid* tumors, includes *fibromata*, *sarcomata*, and *myxomata*, all of rare occurrence. The second group, *epithelial* tumors, includes *cystomata*, *carcinomata* or *alveolar epitheliomata*, and *adenomata* or *muroid epitheliomata*.

For convenience of study, and from a clinical standpoint, they are most conveniently divided into *cystic* and *solid growths*. The cystic tumors include *simple*, *pro-*

proliferating, dermoid, and broad ligament cysts. The solid tumors are *fibromata, sarcomata, and carcinomata*, all comparatively rare.

CYSTS OF THE OVARY.

Cysts may originate in any part of the tubo-ovarian structure; in the cortical, medullary, or parenchymatous structure of the ovary; in its inferior border or hilum; in the structures between the tube and ovary in which are found the remains of the Wolffian body, known as the organ of Rosenmüller, or the parovarian structure; or in the hydatid of Morgani, the obliterated remains of the canal of Gartner. Cysts may also develop in the folds of the broad ligament, and then are known as *broad ligament cysts*. The cysts may be *unilocular* with limpid contents, or *multilocular* with varying contents, some clear and limpid, others thick and viscid, or discolored with admixture of blood.

From an anatomical standpoint it is important to distinguish cystic growths according to the size which they attain. Some of moderate dimensions may be well tolerated or give rise to troubles, which, though painful, do not threaten existence. Others, on the contrary, increase in size with the greatest rapidity from the moment their development has been started.

Small cysts may be subdivided into:—1. *Small residual cysts* coming from Morgani's hydatid, or the horizontal canal of the parovarium. 2. *Follicular*. 3. *Cysts of the corpus luteum*. 4. *Tubo-ovarian cysts*.

Large cysts may be subdivided into:—1, *Glandular proliferating*. 2. *Papillary proliferating*. 3. *Dermoid*. 4. *Parovarian*.

1. **Small residual cysts.** In uterine fibromata and ovarian tumors at the start, there are found either on the broad ligament or on the tubes, small transparent vesicles, but are of no surgical interest. They are of three kinds:—

i. *Cyst of the hydatid of Morgani.* Attached to the fimbriated end of the Fallopian tube there is generally found a cyst varying from the size of a pea to that of a cherry, transparent, and covered with a single layer of endothelium. This hydatid is the remains of the extremity of the canal of Muller.

ii. *Supra-tubal cyst* is no larger than the preceding and has the same appearance and structure. It is probably a micro-cyst of the broad ligament which has slipped under the serous membrane, and worked its way up to this unusual position.

iii. *Micro-cysts of the broad ligament.* Some of these are suspended from Rosenmuller's organ, and some are

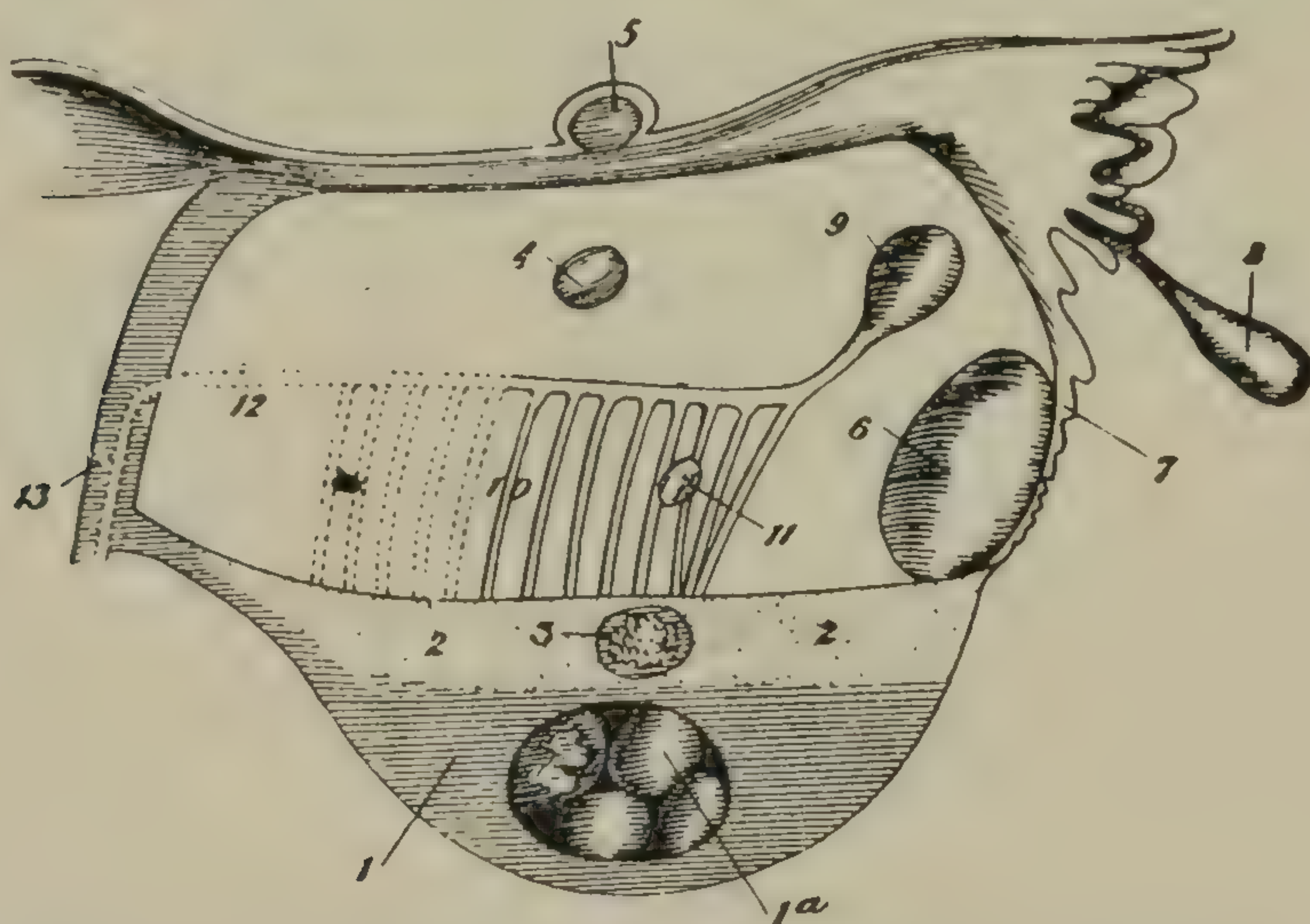


FIG. 96.—Diagram of the structures in and adjacent to the broad ligament. (Dcran.)

1. Framework of the parenchyma of the ovary, seat of a simple or glandular multilocular cyst, 1 a. 2. Tissue of hilum, with, 3, papillomatous cyst. 4. Broad ligament cyst. 5. A similar cyst above tube, but not connected with it. 6. A similar cyst developed close to 7, ovarian fimbriæ of tube. 8. The hydatid of Morgagni. 9. Cyst developed from the horizontal tube of parovarium; cysts 4, 5, 6 and 8 are always lined internally with a single layer of epithelium. 10. The parovarium. 11. A small cyst developed from a vertical tube. 12. The duct of Gartner, often persists in the adult as a fibrous cord. 13. Tract of that duct in the uterine wall.

free and of undetermined origin. Only those which originate from the vertical tubes of the parovarium have ciliated epithelium, and are likely to subsequently develop into papillary growths.

2. **Follicular cysts.** Hydrops of the Graafian follicles was long considered the only or chief cause of large ovarian cysts. From failure to rupture owing to some morbid cause, particularly inflammation of the appendages, the follicles may form cysts from the size of a hemp seed to that of a walnut (cystic ovaritis). There may be exceptionally an agglomeration of several of these sacs, causing the ovary to become as large as the fist or a foetal head (*Rokitansky's tumor*).

3. **Cysts of the corpus luteum.** This cyst, when first described, was believed to be a corpus luteum of pregnancy transformed into a cyst, but microscopical examination of the walls will show the bud-like papillæ characteristic of the corpus luteum. The recognition of this prevents their being confused with follicular cysts, or with suppurative ovaritis. They are generally no larger than a walnut, but cases have been described in which they have attained the size of an orange.

4. **Tubo-ovarian cysts.** The presence of an ovarian cyst not infrequently results in the formation of a tubo-ovarian cyst through its proximity to a distended tube. A dilated follicle or small cyst may rupture into a distended tube with which it is in contact and adherent, and form one sac. They do not usually attain to a large size. The uterine opening of the Fallopian tube may remain pervious and as the fluid increases it passes into the uterus.

Large cysts. Proliferating cysts are also called myxoid cystomata in opposition to dermoid cystomata, because their inner surface resembles a mucous membrane. The term "proliferating" has been given them because they produce new cysts or papillary growths from their inner surface. There are two varieties, *glandular* and *papillary*.

1. **Proliferating glandular cystoma** has a wall composed of the same structures as found in follicular cysts and similar external epithelium, but the internal epithe-

lium undergoes a remarkable proliferation which results in the development of gland-like growths. This epithelium is polymorphous, but the long columnar is the predominant variety. It is stratified and forms pouches, which are at first placed regularly side by side, and are about the same size, but in consequence of the continued proliferation they become closed, thus forming a secondary cyst in the wall of the primary cyst. When the secondary cyst is formed, the same process of proliferation is repeated, so that continually one generation of cysts is

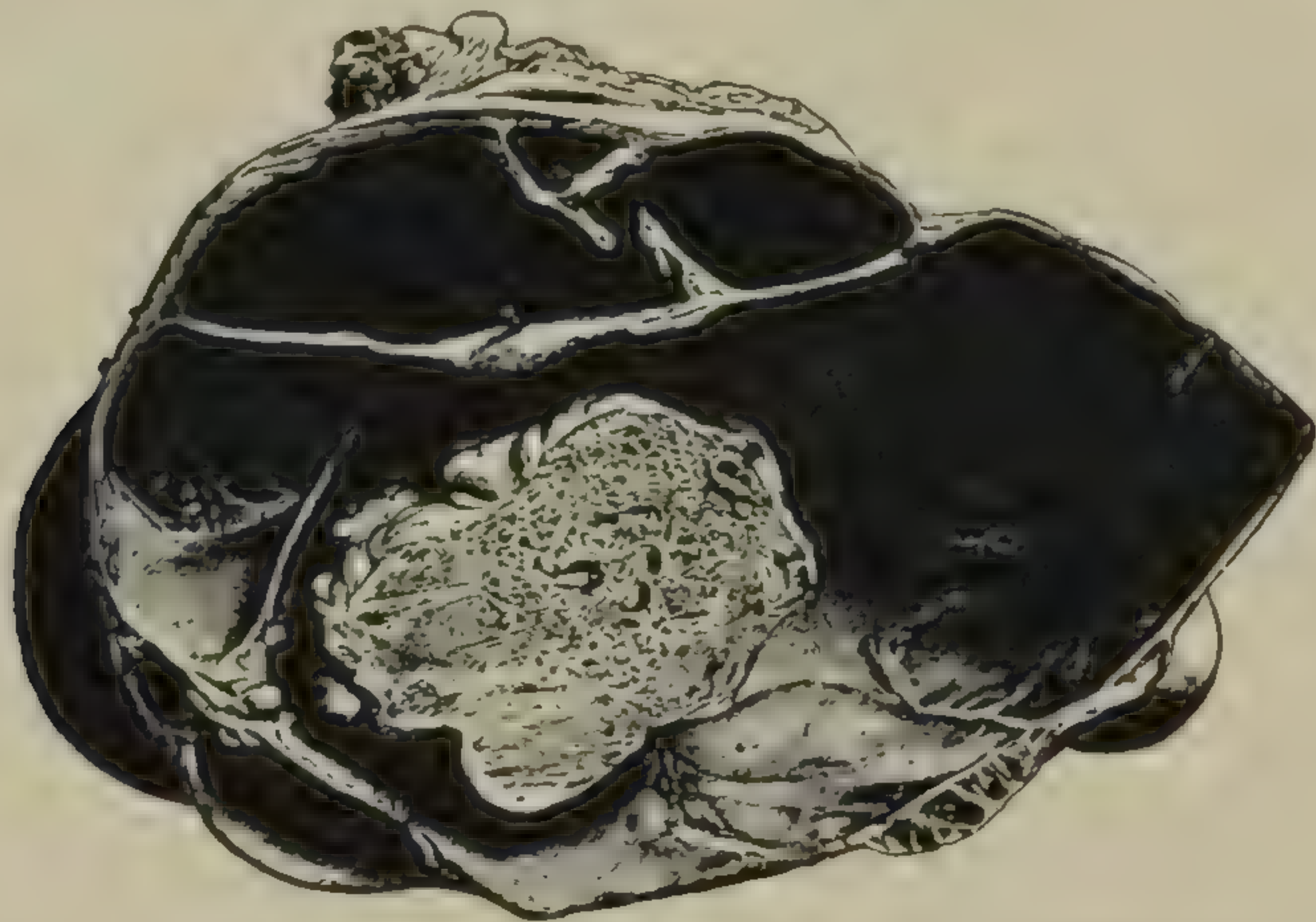


FIG. 97.—Small multilocular cyst. (Museum of the College of Physicians and Surgeons.)

formed in the wall of another. With the production of new cavities, a reduction in their number takes place by the absorption of the partition which separates them. By this continued proliferation of epithelial cells, formation of new cysts, and absorption of their walls, very large tumors are formed, in which, as a rule, one cyst predominates, with a greater or smaller number of secondary cysts in its wall. These cysts are therefore always multilocular from a pathological standpoint, although they may be considered unilocular from a surgical one. This variety of tumor is by far the most common, and may reach an enormous size. The outer layer of the wall corresponds to the albuginea, is smooth and dense in texture, and pearly-grey or white in color. The inner layer furnishes the

connective tissue, and together with the epithelium enters into the composition of the secondary cysts. It is of a reddish color, slightly uneven, and velvety like the inside of the stomach. From the outer layer may grow small excrescences covered with short columnar epithelium. As a rule they have a pedicle.

Contents. In very small new-formed cysts, the tumor may be one solid mass of cells, but as a rule the contents

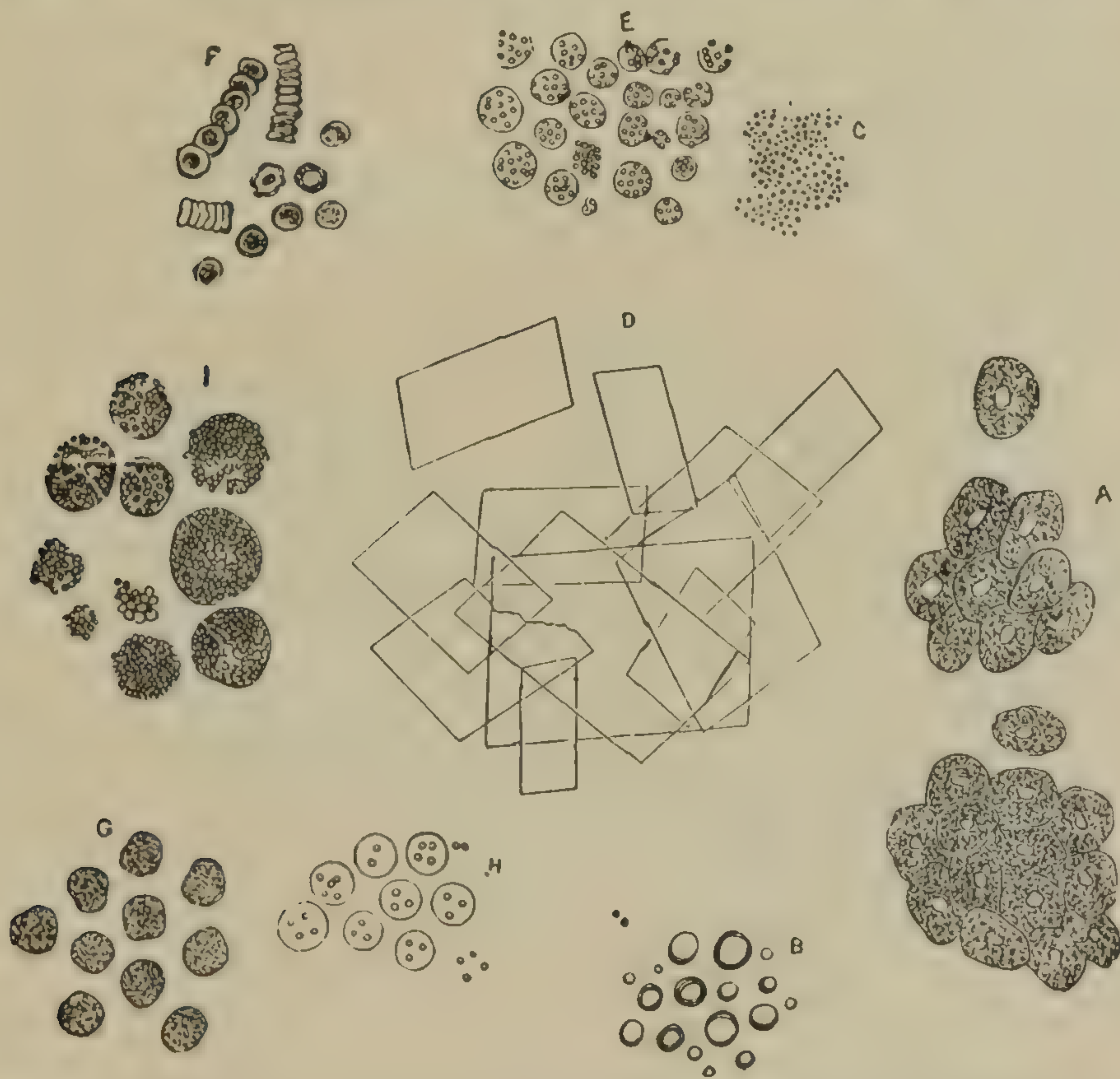


FIG. 98.—Microscopic examination of fluid from ovarian tumors. A. Epithelial cells. B. Oil globules. C. Fine granular matter. D. Crystals of cholesterol. E. Granular cell. F. Blood corpuscles. G. H. Pus cells. I. Inflammatory globules of Gluge.

become more fluid as the cysts grow. The fluid in common ovarian cysts is of a grey, yellow, or brown color. It may be limpid as pure water, or filled with solid bodies as not even to be translucent. Usually it is more or less viscid. Its specific gravity will therefore vary much, but

its reaction is always alkaline. Generally ovarian fluid does not coagulate spontaneously, but by being boiled the contents are more or less completely turned into a solid mass. It possesses a remarkable degree of resistance to decomposition, formed elements being sometimes preserved in it for weeks. As a rule, ovarian fluid is full of a variety of formed elements, red blood corpuscles, epithelial cells, nuclei, pigment granules, finely granular globular bodies like lymph corpuscles or colorless blood corpuscles, pus corpuscles, spindle-shaped cells, and crystals of cholesterin and of indican.

2. Proliferating papillary cystoma is not nearly so common as the glandular, being found in only one out of



FIG. 99.—Papillomatous ovarian cyst. (Museum of the College of Physicians and Surgeons.)

ten ovariectomies, nor does it acquire such large dimensions. They contain a comparatively small number of secondary cysts. From their inside spring dendritic or cauliflower-shaped growths, called papillomata, which may entirely fill the secondary cyst in which they grow and break through its walls into a neighboring cyst; or they may perforate the wall of the primary cyst and cover the outside of the ovary and neighboring parts. They may

even penetrate the uterus, bladder, rectum, or other viscera, so as to form one mass with them. The papillæ range in size from that of a pea to that of a small orange. They are sessile or pedunculated, and may be white, dark red, or black. The interior of a papillary cyst is usually lined with ciliated epithelium, and the contained fluid not viscid or colloid, but of more watery consistency. This kind of tumor is often bilateral, and its development is much slower than that of the glandular variety. It is often accompanied by ascites.

Mixed proliferating cysts. In one and the same cyst some cavities may be of the glandular type, others of the papillary, indicating that there is no radical difference between the two varieties, the glandular variety being built up of the epithelial walls which enter into the formation of the ovaries, the papillary from its connective tissue mainly.

Origin of proliferating cysts. There is still a considerable diversity of opinion in regard to the origin of these cysts. Microscopical examination has shown that both the glandular and the papillary variety may develop from a Graafian follicle. Another source may be the germinal epithelium, which in some ovaries, even of adults, forms pouches extending into the stroma of the ovary. Some claim that the papillary cystomata are developed from remnants of the Wolffian body growing into the ovary from the hilum. The source of the glandular variety is by some thought to be a degeneration of the tunica intima of the arteries in the ovary.

3. Dermoid cysts. These cysts vary greatly from any already described. The internal surface is covered with a membrane which looks like skin and has a similar structure. Upon the surface of the derma are papillæ, and hairs are inserted into hair follicles occasionally provided with a sebaceous gland. The hairs, whether free or implanted, are long, and tawny in color, agglutinated

together by sebaceous matter and sometimes rolled into little balls. Sebum resembling the vernix caseosa, partly fills the cavity, and often forms small isolated masses. It is sometimes oily in consistency, and contains many epithelial cells, cholesterin crystals, and fatty acids. Teeth



FIG. 100.—Dermoid cyst, showing plates of bones and large quantities of long tawny hair.

and bones have been found in these cysts. The bones are inserted in the wall, and are more or less covered by the dermic layer. They are irregular in shape, usually flat, and formed of compact tissue. Cartilage is sometimes present in small patches. The teeth project into the cavity, and are often loosely inserted into alveoli formed of bony debris. As many as one hundred teeth have been found in one cyst. Unstriated muscle fibres have been found in the dermic layer. Cases are quoted where

striated muscle fibre and nerves distributed to the teeth, have been found. A most remarkable case is reported where the cyst, besides skin, hair, and teeth, contained a body which resembled an eye, with a species of convex cornea, and epithelium like that of the retina. There was

also a mucous membrane similar to that of the intestines and stomach, and encephaloid nerve substance.

Origin. The question of the origin of dermoid cysts is one of the most obscure points in general pathology. Various theories have been put forth. It has been ascribed to extra-uterine pregnancy, to diptogenesis by foetal inclusion, and to parthenogenesis due to a proliferation of germinating epithelial cells. The theory of impaction, according to Pozzi, is, on the whole, the most satisfactory. According to this view, during intra-uterine existence certain portions of the blastoderm become impacted by pressure within the tissues, and develop there later, giving rise to an irregular formation of the normal tissues. The outer surface of a dermoid cyst is, as a rule, of a dull gray, or greenish color, with orange or ochre colored patches. They are small, or of medium size, rarely exceeding in size an adult head. Commonly but one ovary is affected, but two or three cysts may develop in the same ovary. A dermoid cyst may form adhesions and rupture into another organ, or on the surface of the body. If it opens into the bladder, hairs may be eliminated with the urine. A dermoid cyst in one ovary may be combined with a proliferating myxoid cystoma in the other.

Etiology of ovarian cysts. Little or nothing is known about the circumstances which cause their development. They are met with at all ages. Simple cysts have been found in the ovary at birth. Even in young children multilocular cystomata have been found. Commonly, however, they appear during the period of greatest sexual activity. Single women are proportionately more liable to the disease than married.

4. **Broad ligament cysts.** Broad ligament, or, as they are sometimes called, parovarian cysts, are not in reality cysts of the ovary, being anatomically separate from it, but are best described in connection with the latter, being surgically and clinically closely connected to

them. Broad ligament cysts are much rarer than ovarian cysts, and, as a rule, are monocystic. Commonly they do not exceed the size of a pregnant uterus at six months gestation, but exceptionally they may become enormous. As a rule, the wall is so thin as to be translucent, but in exceptional cases, the cyst may look like a uterine growth,

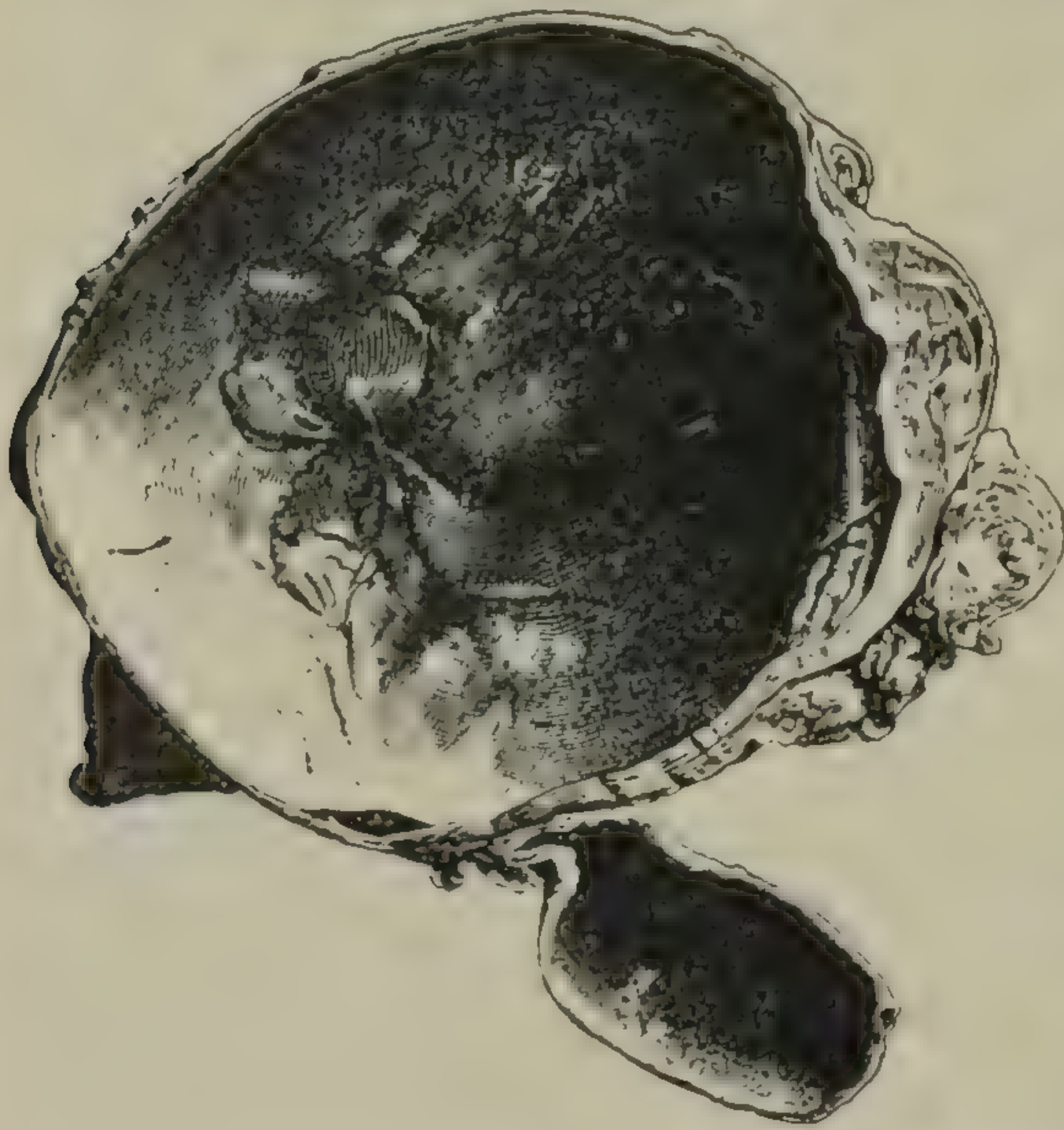


FIG. 101.—Unilocular cyst. (Museum of the College of Physicians and Surgeons.)

on account of the thick layer of involuntary muscle fibres. The wall is composed of peritoneum, a layer of connective tissue containing muscle fibres, and but few blood vessels, the absence of which gives it its white color. Its internal surface is smooth, or wrinkled, but has no glandular formation, and is covered with a single layer of epithe-

lium. The fluid is normally watery, nearly colorless, and alkaline or neutral. It does not coagulate spontaneously, nor to any extent by heat before adding an acid. Papillary and dermoid cysts may also develop in the broad ligament. As a rule cysts of the broad ligament are sessile, but sometimes the ligament forms a pedicle. They are found during the period of sexual maturity; they grow very slowly, do not impair the health, and give rise to no symptoms except such as are produced by their bulk.

The pedicle. Whatever the origin of ovarian cysts, there is one important point in their surgical history, the presence or absence of a pedicle. Ovarian cysts as a rule rise up into the abdomen, and are connected with the uterus by means of a pedicle. In some cases the develop-

ment takes place downward, so that the cyst is situated between the layers of the broad ligament, more or less close up to the uterus, and accordingly has no pedicle. The pedicle may be long or short, thick or thin, broad or narrow. It always contains the ligament of the ovary, and part of the broad ligament, and, as the tumor grows, the Fallopian tube is drawn in so as to form part of it, and is as a rule both elongated and thickened. The arteries may become as large as the radial and the veins the size of the finger. Besides these structures, lymphatics, nerves, involuntary muscle fibres and connective tissue, all forming a bundle covered by a peritoneal sheath, enter into its formation.

Accidents and complications. 1. *Torsion of the pedicle.* When the pedicle is long and thin, the tumor from some cause may rotate on its axis. Sudden torsion may lead to gangrene and fatal peritonitis. If it develops slowly, it will cause œdema and hyperæmia of the wall, hemorrhage into the wall and cavity, or suppuration. If the torsion continues the whole pedicle may be severed. Torsion of the pedicle may involve the intestine and cause its occlusion; on the other hand it may effect a cure, by causing atrophy from diminished blood supply.

2. *Adhesions.* So long as the wall is covered with its epithelium it slides freely over the surfaces with which it comes in contact, but when the epithelium is rubbed off, or covered by inflammatory exudation, adhesions to the surrounding structures or organs are easily formed.

3. *Ascites.* An accumulation of ascitic fluid sometimes accompanies an ovarian cyst, especially the proliferating papillary variety.

4. *Hemorrhage.* Blood, arising from erosion of the vessels, ulceration of the walls, or torsion of the pedicle, may be poured into the cystic cavity, imparting to the fluid a dark red or brown color.

Suppuration. The wall of a cyst may become inflamed and the contents changed to pus. The suppuration may be due to torsion of the pedicle, to puncture of the cyst, or to puerperal infection.

6. *Rupture.* The cyst may rupture and pour its contents into the abdominal cavity, when the fluid, if unirritating, may become absorbed. Bloody, ichorous, or purulent fluid, and the contents of dermoid cysts cause more or less violent peritonitis, and very likely death. Rupture may also occur into the intestine, stomach, vagina, bladder, or Fallopian tube, or through the abdominal wall, especially at the umbilicus.

7. *Calcification and ossification* may take place to such proportions that the whole tumor may be changed into a hard shell.

8. *Cancerous degeneration.* Proliferating glandular cystomata and dermoid cysts may become malignant and implicate neighboring organs, and with the formation of metastatic deposits elsewhere.

Symptoms. The onset is characterized by vague disturbances which do not differ from those described under uterine symptoms. They are at first reflex troubles due to congestion and stretching of the appendages, later come symptoms due to pressure on the rectum and bladder, but the latter are often absent. Following these occurs the period of tumefaction, when the abdomen becomes more or less distended, and the general health affected.

Two stages in the development of cystic tumors can be recognized. In the first stage the tumor is small, is hidden in the pelvis, and recognized only by bimanual palpation. In the second stage the tumor has become abdominal and may be felt through the walls.

Pelvic stage. As soon as the tumor has attained three or four times the size of a normal ovary, it falls into Douglas' cul-de-sac. Bimanual examination will determine its presence, and its situation and connections, as well as its

ovarian nature. It is usually hard, because of the small size and great tension of the capsule. When it has a well defined pedicle it is very movable. When included in the broad ligament it seems to be one with the uterus, but careful examination will reveal a slight groove between them. Tumors limited to the size of the fist or foetal head will probably remain permanently in the pelvis, otherwise they will ascend into the abdominal cavity.

Abdominal stage. By palpation a well defined spherical tumor is felt above and laterally, but less marked below. Irregular shape or protuberances generally indicate a polycystic tumor. Fluctuation may be felt, the degree depending upon the size of the tumor and the elasticity and thickness of its walls. Percussion over the tumor gives dulness. Bimanual palpation reveals the uterus anteverted, lying just in front of the pubes, and pushed slightly to the opposite side from the cyst. The cervix is drawn upward and not easily within reach. In some cases the uterus may be pushed downward, and in cysts of the broad ligament it may be pushed completely to one side. The sound sometimes will show decided elongation of the uterine cavity.

When the cysts have grown to a large size the abdominal walls will be thinned out, fluctuation will be more readily made out, while towards the sides solid masses are often found. Percussion elicits flatness over an irregular spherical area, convex above, and separated from the region of hepatic dulness by a zone of resonance. Pressure on the aorta and crural arteries may cause vascular souffles.

Menstrual disorders are rather rare. Menorrhagia is often very extensive in follicular cysts of the ovary. Sterility is an unavoidable result when both ovaries are affected, but a unilateral ovarian cyst sometimes complicates pregnancy. Pressure upon the bladder often produces incontinence of urine, and upon the rectum constipation. When the tumor reaches very high in the

abdomen, the movements of the diaphragm may be seriously embarrassed, causing dyspnoea and cyanosis.

Sooner or later the general health becomes rapidly impaired, caused by compression of the various portions of the digestive apparatus, joined with a reflex dyspepsia observed in the course of all utero-ovarian diseases. Compression of the ureters, though it may not for a long time cause albumenuria, does cause serious uropoietic disturbances, and adds to the malnutrition of the system. Pressure upon other organs, causing pain and sleeplessness, act in the same way by adding to the general enfeeblement. When combined these conditions produce an appearance of ill health and distress to which Spencer Wells has given the name "fascies ovariana."

Prognosis. "When ovarian tumors," writes Spencer Wells, "attain such a size that the general health is affected, the length of life granted to the patient will probably not exceed two years, and these two years usually consist of serious trouble, even of torture and despair." However, in some rare cases, the course of the disease may be very slow. Unilocular broad ligament cysts may rupture into the peritoneum several times in succession, with quite a long respite after each rupture. On the other hand, proliferous cysts, after remaining quiescent for a long time, may suddenly take a rapid course. [An absolute or relative spontaneous cure is not an impossibility. Intra-peritoneal rupture often brings about the cure of broad ligament cysts. Gradual torsion of the pedicle may, exceptionally, cause atrophy. Death is the ordinary result of cystic development, unless there be surgical interference. Marasmus, peritonitis, and embolus are the three causes of death. Ascites, although not necessarily fatal, is an unfavorable occurrence.

Papillary cysts tend towards malignancy, and when so diagnosed, should always make the prognosis very guarded. Glandular cysts may also undergo cancerous degeneration.

Certain clinical symptoms, indicated by sudden development of a tumor which has already existed for some time, rapid emaciation and cachexia, multiple adhesions, especially in the pelvis, œdema of the lower limbs and abdominal walls out of all proportion to the size of the tumor and the amount of ascites present, leave no doubt in such cases.

Diagnosis. 1. *In the pelvic stage.* In the early stages of ovarian cysts, it is difficult to distinguish them from other tumors situated by the side of the uterus. A sessile cyst of the broad ligament might be simulated by a *cellulitis* or *salpingitis*, but a remembrance of the previous symptoms, and the course of the disease, will prevent error. A small pelvic hæmatocele shows fluctuation at first, but does not give the sensation of an encapsuled tumor, while the manner of its appearance is entirely different.

Extra-uterine pregnancy in the beginning has few distinctive symptoms, except those of amenorrhœa and congestion of the genital mucous membrane. Later it is characterized by special signs which will be referred to in a subsequent chapter.

Retroflexion of the gravid uterus will be suspected when the signs of early pregnancy are present.

2. *In the abdominal stage. Pregnancy.* Error in such a case is a very serious one, and is most likely to be committed when there is hydramnios, for then it is difficult to palpate the foetus or hear the foetal heart sounds. It must not be forgotten that amenorrhœa, swelling of the breasts, and imaginative sensations of foetal movements, produced by borborygmus, may exist in a case of ovarian tumor. The diagnosis will be settled only by the perception of foetal movement, the hearing of the heart sounds, the identification of foetal parts, contraction of the gravid uterus, ballottement, and toward the end of pregnancy engagement of the foetal parts.

Ascites. Ascites may simulate a large cyst. In effusion of fluid within the pelvic cavity, the abdomen is more spread out, less acuminate, and on percussion flatness is found in the dependent portions, and tympanites on the uppermost surface of the dome. In a position of lateral decubitus, the fluid gravitates to the side and iliac fossa, while the tympanitic note appears on the opposite side, where it did not previously exist. This displacement of the fluid is very characteristic. In cases where ascites has rapidly developed in connection with an ovarian

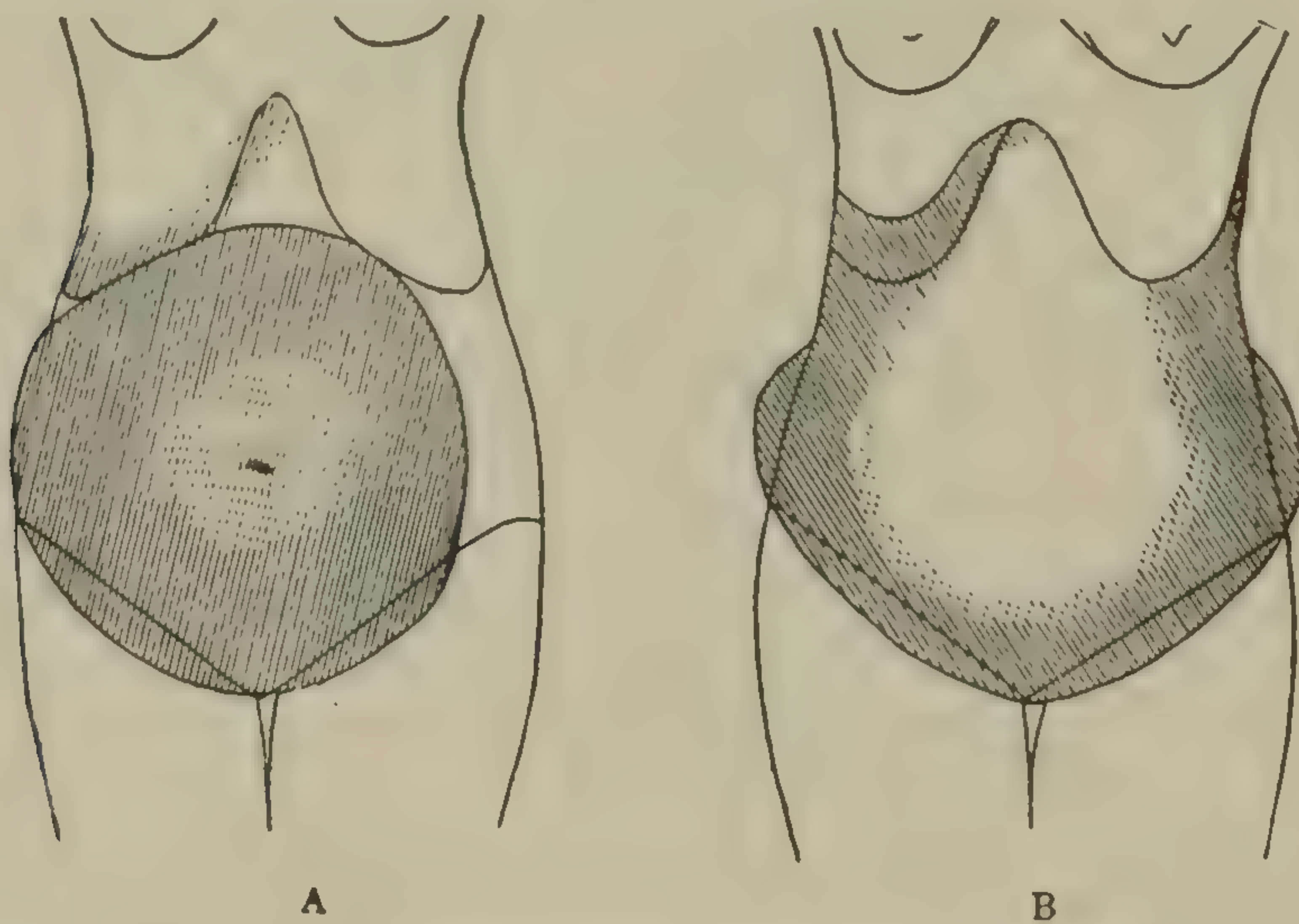


FIG. 102.—The shaded portion shows the area of dulness.
A. Ascites. B. Ovarian tumor.

tumor, much difficulty may be experienced in making a diagnosis, but the rapid increase in the size of the abdomen, œdema of the lower limbs, decline of the general health, and the absence of a previously existent tumor, will assist in making a correct diagnosis. Another sign to be looked for is mobility of the uterus, which is present in ascites and absent in large cysts. Finally the condition of the heart and liver should not be overlooked, disease of either of which often gives rise to ascites.

Tubercular and cancerous peritonitis. In the first named there will be signs of intestinal or pulmonary

tuberculosis, and irregularities in the shape of the abdomen due to meteorism interfered with by adhesions. In the case of cancer there will be the presence of irregular masses in the mesentery and neighboring parts, together with rapid cachexia. Puncture may be of service in establishing a diagnosis, but at the present day it is usually omitted. Even when done with the greatest precaution it is by no means a harmless operation. It may be followed by effusion of fluid into the abdominal cavity and fatal peritonitis; or by suppuration of the cyst; or by grave hemorrhage from wounding a blood vessel in the abdominal wall; or an overlying portion of intestine may be punctured. If the tumor be of the papillary form, there may be escape of vegetations into the abdominal cavity, and consequent infection of the peritoneum. If none of these accidents happen, the puncture is apt to set up inflammatory adhesions, which, if extensive, or of long standing, may complicate the removal of the tumor subsequently.

Uterine fibroids. Uterine fibroids, particularly fibrocystic ones, may simulate ovarian cystomata, but a careful examination under an anæsthetic, taken in consideration with the history and symptoms of fibroids, will generally make the diagnosis easy.

Hæmatometra may be recognized by its situation and special etiology.

Vesical distension has been the source of numberless errors, but may be avoided by the employment of a catheter before proceeding to examine.

Renal tumors, hydronephrosis, and hydatidiform cysts have also given rise to mistakes. In such cases the diagnosis may be made by ascertaining whether the tumor is fixed in the hypochondrium, and free inferiorly, permitting the hand to be passed beneath it quite far above the pubes; and also by ascertaining whether the intestines, especially the colon, are interposed between the tumor and the abdominal wall. Tumors of the liver,

spleen, mesentery, omentum, and echinococcus, may also give rise to error, which sometimes can only to be cleared up by cœliotomy. Tumors of the abdominal wall, phantom tumors, tympanites associated with partial contraction of the abdominal muscles, or superabundance of fat in any particular spot, may give rise to difficulty in making a diagnosis, particularly in hysterical patients, but the difficulty may be overcome by examination under an anæsthetic.

Treatment. It is scarcely necessary at the present day to reiterate the statement made by all writers, that there is only one form of treatment for ovarian cysts, and that is extirpation.

Medicinal treatment. Electrolytic puncture, injections of iodine and other astringents into the cyst are now regarded as malpractice. It is only a few years since it was the frequent practice to tap the cyst several times before its removal, a proceeding which has been abandoned by all who recognize its dangers. There may be circumstances under which it may be impossible to perform ovariectomy on account of the objections of the patient or of the friends; or where the presence of cancer, extreme weakness, or grave visceral complications would render an operation inevitably fatal. In such cases tapping may be resorted to, to relieve immediate symptoms.

OVARIOTOMY.

Ephraim McDowell, of Kentucky, was the first to do an ovariectomy for ovarian cyst, in 1809. The pedicle was left in the abdomen, and a cure followed. Subsequent to this there were isolated cases of bold operations which found no imitators. In America, in 1844, W. L. Altlee commenced a remarkable series of operations which, in 1871, reached the number of two hundred and forty six. Ovariectomy can be said to have been thoroughly established in America after the year 1865. In England,

between 1852 and 1856, Baker Brown operated nine times. In the year 1858 commenced the remarkable career of Spencer Wells, and which was kept up almost to the time of his death, when he had well passed the thousand. The next prominent figure in ovariectomy is that of Thomas Keith, of Edinburgh, who performed his first operation in 1862. On the Continent, the names of Koeberle, Schroeder, Billroth, Martin, and others, are honorably associated with the operation. The introduction of antiseptics into the field of surgery introduced a new phase of existence for the operation. Ovariectomy has now passed from the hands of a few eminent specialists into those of surgeons all over the civilized world. In every capital, city, or town, there are surgeons who, with honor to their art and credit to themselves, successfully perform the operation which, half a century ago, was condemned by the leaders of surgery as being little removed from murder.

The operation. The patient having been prepared according to the general directions given in an early chapter, she is placed upon the back on the operating table. The incision is made in the middle line, between the pubes and the umbilicus, after the manner already described. On reaching the peritoneum it will be found to vary in thickness. It may be thinned by distension, or thickened by constant irritation or inflammation. When there has been much inflammation, the peritoneum may be a thick highly vascular tissue, which bleeds freely on division. The incision is made in that structure long enough to admit of the extraction of the collapsed and empty cyst without using force. If the tumor is unusually large, or the adhesions abundant or very dense, it may be subsequently enlarged to suit the conditions present.

Emptying and delivery of the cyst. Whatever be the condition present, it is always best to begin by emptying the cyst, and the best mode in the large majority of cases is by tapping. For a cyst of small size Wells' small cyst

trocar, and for a large one Tait's instrument with blunt conical point, may be used. To prevent the escape of fluid at the side of the trocar, a flat sponge wrapped around the point of introduction will suffice. After the trocar has entered the cyst cavity and the walls become flaccid, large forceps are made to grasp the cyst wall and pull it steadily but gently out of the wound, keeping the parietes of the tumor in easy contact with the abdominal parietes. A flat sponge placed between the cyst and the parietes may be useful in preventing the escape of fluid into the abdominal cavity. Secondary cysts may be emptied without removing the cannula from the main cyst, but while this is being done, the fingers inside the abdomen should make certain that the trocar is not pushed through the main cyst wall. As the cyst is withdrawn the trocar opening is pulled over the edge of the wound, and as soon as it is clear of the abdominal opening, a fold of the cyst wall above and below is caught in strong forceps. The trocar is now removed, and if the sac has not been emptied sufficiently for its total withdrawal, it may be incised between forceps, permitting the cyst contents to run down into the ovariectomy pad.

Adhesions. If, after emptying the cyst as completely as possible, adhesions prevent its being delivered, the important step of separating them is to be begun. For separating very soft, fine, and recent adhesions, a sponge may be used, the adherent structure being, so to speak, sponged away from the tumor. Adhesions of firmer consistency may be dealt with in various ways. If comparatively recent they may be peeled off with the fingers. If the adhesions are old, fibrous, and thick, they may be surrounded by ligatures and divided. During the separation of adhesions the walls of any of the hollow viscera may be torn. Such laceration must of course be immediately closed by suitable sutures. If at any point the connection to the bowel or bladder is so intimate that complete separ-

ation seems dangerous to the integrity of the organ, then a thin layer of the adherent portion of the cyst wall must be cut off and left behind.

Treatment of the pedicle. The pedicle has been subjected to almost every conceivable surgical treatment. "It has been tied entire, tied in sections, been twisted off, burnt off, crushed off, cut square off, cut off in flaps, left inside, left outside, and has been made to slough off."—(Bland Sutton.)

The extra-peritoneal treatment by the clamp is now permanently abolished, and needs no description. The silk ligature is now almost universally used for securing the pedicle, although strong coarse catgut is used by some

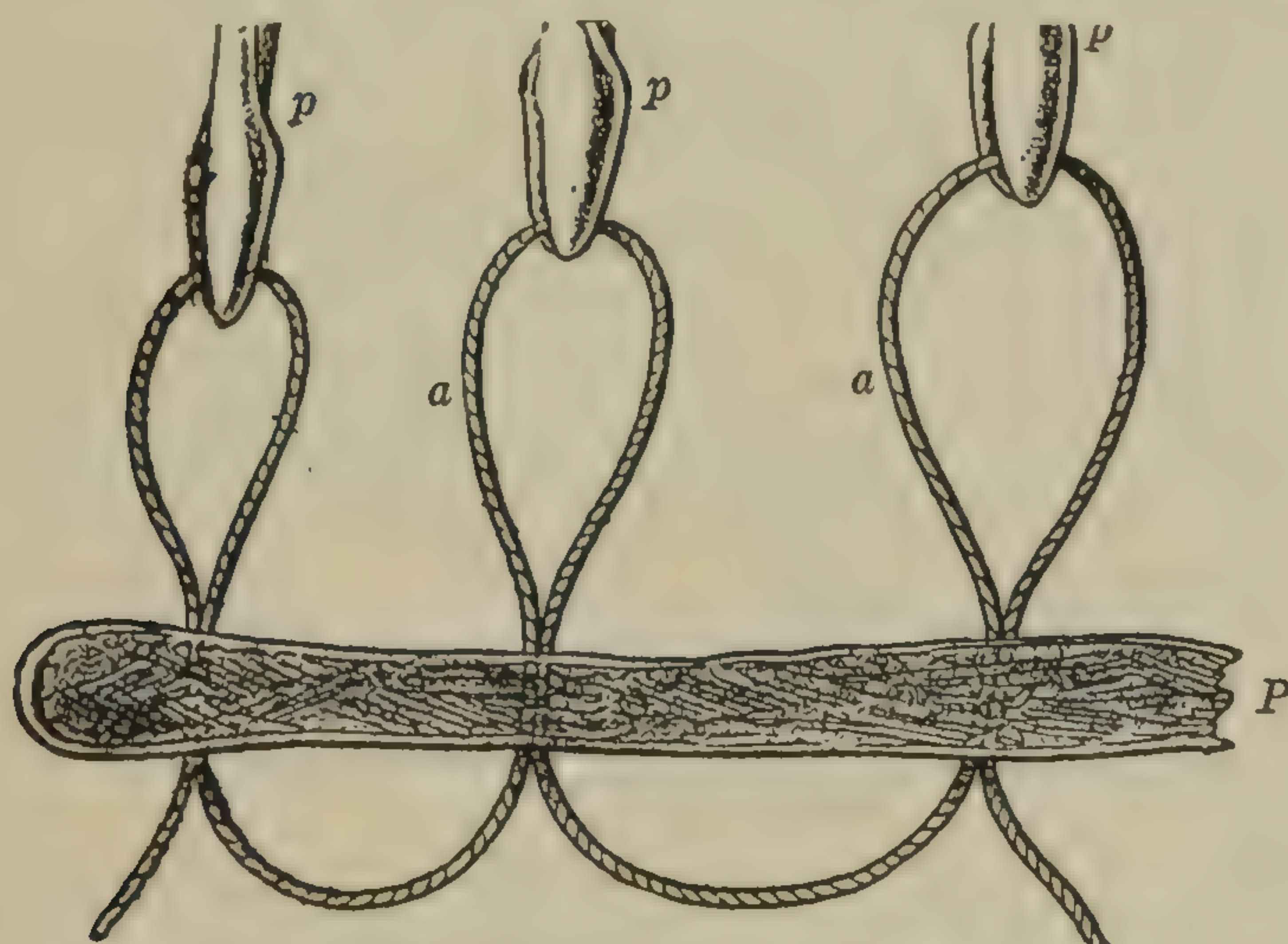


FIG. 103.—Ligation of pedicle in three sections.

surgeons. After fully exposing the pedicle, and estimating its size and the position of the blood vessels, a pedicle needle, threaded with stout silk, is passed through the centre, taking care to avoid all vessels. After dividing the silk into two equal parts, the needle is unthreaded and withdrawn. Each division of the ligature, after interlocking it with the other, is tied over its own half of the pedicle, and then returned and tied over the opposite half.

When the pedicle is very broad it may require ligation in sections. This may be done by passing the pedicle needle, armed with an extra long silk ligature, through the pedicle one third distant from the margin. The loop thus formed is caught on one finger and the needle still threaded withdrawn, and reentered midway between the last point of entrance and the opposite margin. The pedicle needle is again withdrawn and the loops arranged so that they will be of equal length. The ligature is divided at the loops, and after interlocking one with the other, each ligature is separately tied so as to include its

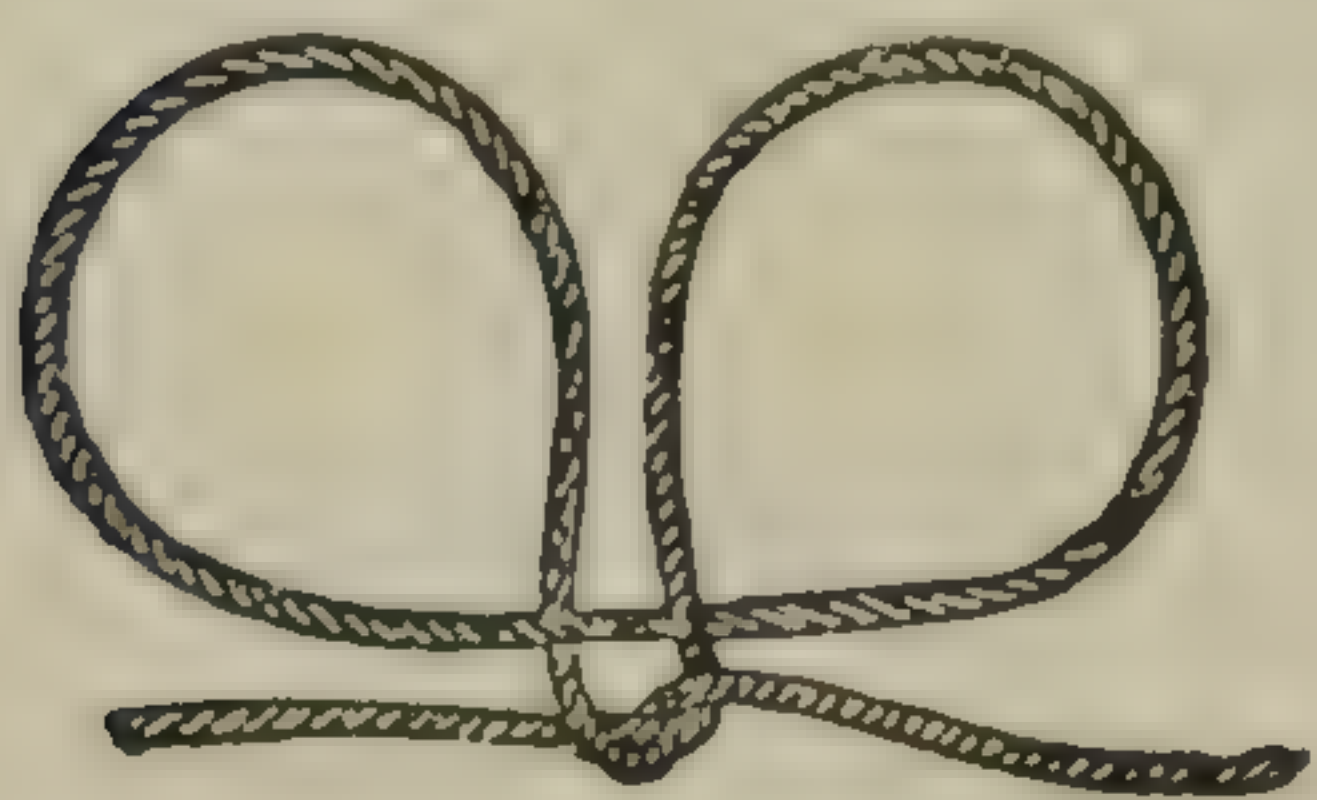


FIG. 104.—Staffordshire knot.

own section. The ends of the outer ligatures may be reversed and tied around the opposite sides of the pedicle. A favorite method for securing the pedicle is that known as the "Staffordshire knot." The pedicle needle, armed with a silk ligature, is passed through the pedicle and then withdrawn, so as to leave a loop on the distal side. This loop is then drawn over the tumor, and one of the free ends drawn through it, so that one end is above while the other is under the retracted loop. Both ends being seized in the hand, they are drawn through the pedicle until complete constriction is made.

The pedicle secured, it may now be divided at a distance from the ligature sufficient to prevent it slipping, and the stump allowed to drop back into the pelvic cavity. The peritoneal cavity, if necessary, is to be carefully cleansed, taking care not to overdo it. A sponge on a holder is left in contact with the stump of the pedicle until the parietal sutures are introduced, after which it may be withdrawn, and if it indicates that no hemorrhage is going on, the abdominal wound can be closed.

Accidents during operation. Mishaps, such as the escape of fluid into the cavity, hemorrhage, or injury to

the viscera, may occur during the most simple ovariectomies, and they are especially frequent in difficult cases. It is necessary therefore for every surgeon, to be successful, to be able, promptly and efficiently, to deal with such accidents, and without such knowledge no surgeon should undertake an ovariectomy.

Broad ligament cysts, as a rule, grow away from the ligament, pushing aside the ovary and tube, and occasionally they exhibit a well marked pedicle. Sometimes, however, they may grow downward, widely separating the layers of the broad ligament, and stretching out the tube and ovary over their walls. Adhesions are rare, but spontaneous rupture is not infrequent. These cysts were once removed by tapping or aspiration, and their innocuous nature and slowness to refill are great inducements to use that kind of treatment, but since it has been discovered that some of them are papillary growths, and the radical operation in most cases easy and safe, extirpation is preferred. Their removal, when there is a pedicle, is to be accomplished the same as in ovarian tumors.

In some rare cases, when the cyst grows between the layers of the broad ligament, removal may be attended with considerable difficulty. Here there is no pedicle, and the base of the cyst lies deep in the pelvis. The growth in these cases must be dissected out between the layers of the ligament. Beginning on the side next the uterus the peritoneal investment is opened, and the wall of the cyst exposed. The finger pushed into the cellular tissue separates the cyst from the ligament, bleeding vessels being caught up by forceps. Step by step the process is continued until the cyst is completely enucleated from its bed. The two flaps representing the layers of the broad ligament may, according as seems best at the time, be left untouched, or united by suturing; or after ligation in section, its upper portion may be cut away and the peritoneal structures turned in and sutured.

Incomplete operations. The presence of firm general adhesions of an intra-ligamentous cyst which will not permit of its being enucleated without extreme shock and loss of blood, or the sudden collapse of the patient in the middle of the operation, may determine the surgeon to conclude it without total removal, or as rapidly as possible. In such cases the cyst may be emptied, and after being drawn up into the wound, as much of the sac as possible may be excised, and the remaining portion sutured in the lower angle of the wound and drained by gauze packing. The method of draining by an opening through the vagina presents many advantages, especially in the case of suppurating cysts firmly adherent to the floor of the pelvis.

SOLID TUMORS OF THE OVARY.

Under this heading is included *fibroma*, *sarcoma*, and *epithelioma* or *carcinoma*.

Fibroma. Fibroids of the ovary are rare. They do not form circumscribed new growths like fibroids of the uterus, but seem rather to be a kind of fibroid degeneration of the organ, and so uniformly hypertrophied that its shape and relations are not altered. As a usual thing they are small, not larger than a hen's egg or an orange, but they may reach larger proportions. They are hard in consistency and have a mammillated surface. They usually have a pedicle, and are free from adhesions because of the ascites which they produce. They may become cystic, due to dilatation of the lymph spaces in the connective tissue—the so called *geodes*—and filled with a coagulable serous fluid.

Symptoms. The symptom which usually first attracts notice is ascites, caused by the excessive mobility of the tumor. When this symptom is absent, the tumor may escape notice, or may accidentally be discovered by attention being drawn to the patient, owing to menstrual disturbances. It is almost impossible to diagnose it from

a pedunculated fibroid of the uterus. The treatment consists in its removal by vaginal or abdominal hysterectomy.

Sarcoma. This neoplasm is of rare occurrence. It may be primary, or it may develop secondarily in an ovarian cystoma, and is often bilateral. It forms a pink tumor, ranging in size from that of a small orange to that of an adult head. It is globular or oval, has a smooth surface, and of varying consistency according to structure. Spindle-celled sarcoma is the most common variety, but round celled and mixed celled sarcomata are also found. From a clinical point of view these tumors are of great malignancy, and the symptoms are those of a rapidly developing malignant tumor. Ascites is always present and cachexia rapidly appears, features which distinguish it from fibroma.

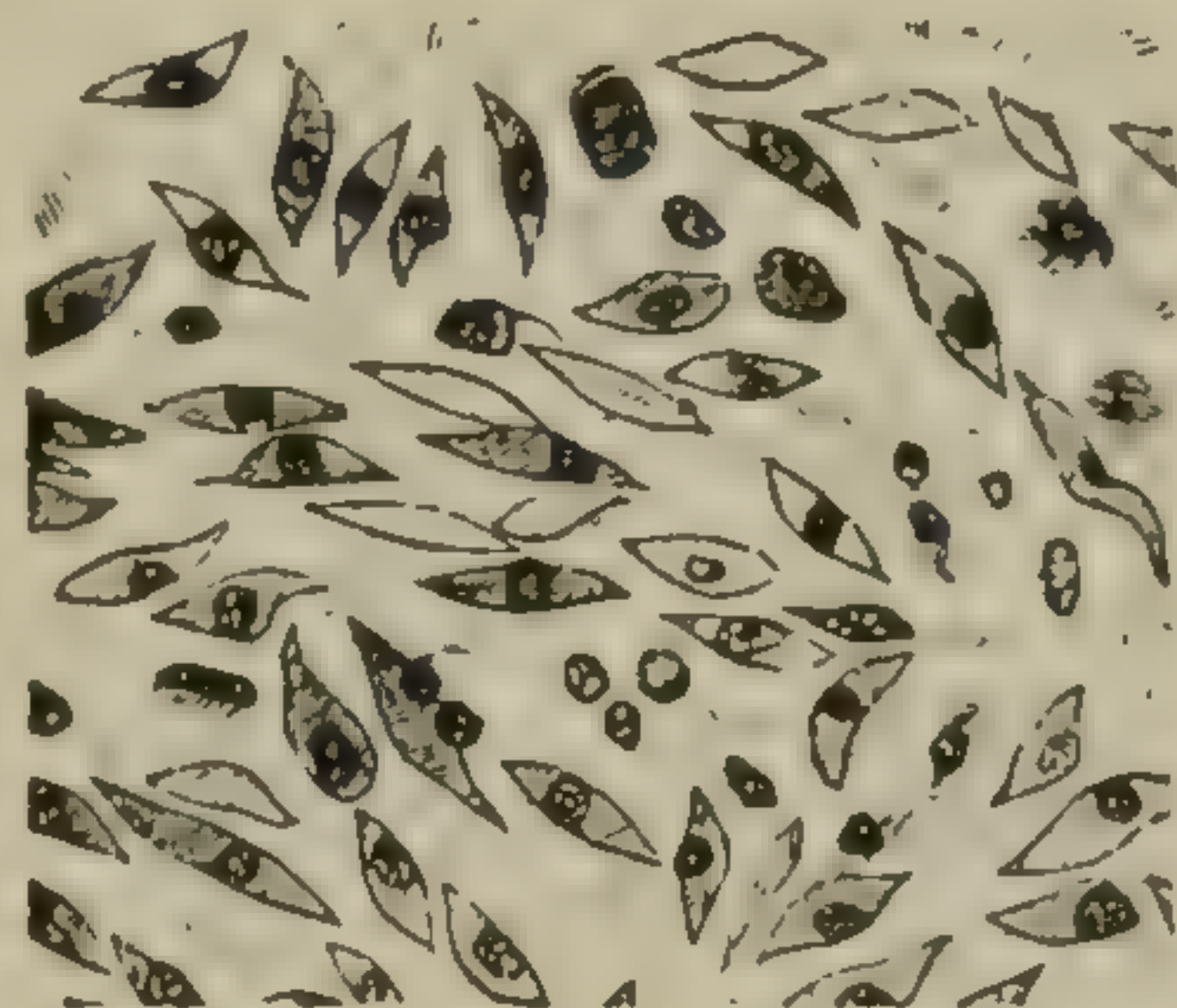


FIG. 105.—Spindle-celled sarcoma of the ovary.

Epithelioma or carcinoma. If secondary cancerous degeneration of cysts is excluded, primary cancer of the ovary is very rare. It may affect the young as well as the old, and is apt to be bilateral. Two principal anatomical forms are described; one, a diffuse infiltration of the ovary, originating in the epithelium of the follicles of Pfluger's ducts; the other a superficial development from germ epithelium. In the former, the ovary retains its shape for a long time, with the exception that its surface becomes nodular. It may attain the size of an adult head, and as it increases in size the pedicle and broad ligament become infiltrated. In the latter variety a dendritic growth appears on the surface of the ovary, which, in the later stage cannot be distinguished from papilloma of the ovary.

Ascitic fluid, possibly tinged with blood, is characteristic of this disease, and the other symptoms will be similar to those of sarcoma. The diagnosis is based upon

the blood tinged ascites, infiltration of the broad ligament, upon the existence of nodules about the recto-uterine cul-de-sac, and upon the rapidly appearing cachexia. When seen early, the treatment consists of performing oophorectomy; later the treatment can only be palliative.

CHAPTER XXX.

ECTOPIC GESTATION.

By this term is generally understood development of the impregnated ovum outside the normal uterine cavity. No entirely satisfactory conclusions have yet been reached regarding the cause of this form of pregnancy. The chief difficulty lies in the fact that it has not yet been determined at what point of the female genital tract normal impregnation of the ovum takes place, and until this question is settled, the primary question, whether extra-uterine foetation is an abnormal ectopic impregnation, or is simply a detained impregnated ovum, must remain unanswered.

Etiology. It is claimed by many that the seat of coalescence of the male and female elements is normally in the Fallopian tubes, and if such be admitted, it can readily be seen how a variety of causes may operate to detain the ovum in the tube. The most frequent conditions named as tending to bring about ectopic gestation, are :—Adhesions of the ovaries and tubes, the result of peri-salpingitis; loss of ciliated epithelium; flexion of the tubes; dilatations and diverticula; constrictions from inflammatory changes; and polypi of the tube, closing its lumen like a ball valve. Until recently it was the common belief that the ovum might, after fecundation, develop primarily in the tube, within a Graafian follicle, or in the peritoneal cavity. Modern research, and the advantages for observation which early cœliotomy has given in such

cases, have changed to a considerable extent the views once held. At the present time the weight of opinion leans towards accepting two primary forms of ectopic gestation, the tubal and ovarian, although many able writers assert that all ectopic gestations are originally tubal.

Classification. Ectopic gestation may be divided into *primary* and *secondary* forms. The primary form may be thus classified:—

1. Tubal. { *a.* Tubo-uterine or interstitial.
 b. Isthmial.
 c. Ampullar.
2. Ovarian.

In tubal pregnancy when the fertilized ovum develops out near the fimbriated extremity it is called *ampullar*; when at the inner portion of the tube it is called *isthmial*; and when in that part of the tube which traverses the uterine walls, it is designated *interstitial* or *tubo-uterine*.

The secondary forms of ectopic gestation are derived from the primary. The tubo-uterine or interstitial may rupture into the uterus and be followed immediately by expulsion of the fœtus, or it may go on to full term and be delivered in the natural way. It is more likely, however, to rupture into the abdominal cavity, or into the broad ligament. In the isthmial form, the rupture occurs into the abdominal cavity, giving rise to a secondary abdominal pregnancy; or into the broad ligament, forming extra-peritoneal broad ligament pregnancy. The ampullar form of tubal pregnancy gives rise to secondary tubo-ovarian, abdominal, or broad ligament pregnancy. The ovarian form gives rise to tubo-ovarian, or abdominal pregnancy. The secondary forms thus derived from the primary may be classified as follows:—

1. Interstitial. { *a.* Uterine.
 b. Broad ligament.
 c. Abdominal.

- | | | |
|--------------|---|---------------------------|
| 2. Ampullar. | { | <i>a.</i> Tubo-ovarian. |
| | | <i>b.</i> Abdominal. |
| | | <i>c.</i> Broad ligament. |
| 3. Isthmial. | { | <i>a.</i> Abdominal. |
| | | <i>b.</i> Broad ligament. |
| 4. Ovarian. | { | <i>a.</i> Abdominal. |
| | | <i>b.</i> Tubo-ovarian. |

Tubal pregnancy. In the first week after fecundation the tube begins to thicken, which is mostly due to excessive vascularization, and not, as in the case of the pregnant uterus, to any great increase in its tissue elements. As pregnancy progresses, the wall of the tube becomes thinned and stretched, until in some cases it appears as a thin transparent membrane, composed only of an attenuated stratum of muscle covered with peritoneum. The development of the foetal membranes is the same as in intra-uterine pregnancy, except that the placenta is largely foetal in its origin. During the first four to six weeks, the abdominal ostium of the tube becomes hermetically sealed. Until the foetal membranes are well formed, the chorionic villi have but a feeble hold upon their points of attachment, and may be easily separated. Should this occur during the first two or three weeks of pregnancy, it will probably give rise to no serious discomfort, but, if later, the accompanying hemorrhage may cause rupture of the tube, followed by death of the mother.

If the ovum continues to grow, the point of attachment of the placenta is one of great importance to the mother. If it is implanted in the upper wall of the tube, she is in constant peril, for rupture means almost certain death from hemorrhage, there being no counter-pressure to control the lacerated or detached placenta. If implanted on the floor of the tube the chances for rupture are decreased, and when rupture occurs the dangers from hemorrhage are diminished, owing to the placenta being pushed downward against the resisting pelvic floor. Occasionally the ovum

is lightly attached in the ampullar extremity of the tube, and is extruded into the abdominal cavity without rupture of the tubal wall. This extrusion is known as *tubal abortion*.

Tubo-uterine, or interstitial gestation. In this type the muscular fibres of the uterus undergo the same changes as in normal pregnancy. Rupture is almost inevitable, but it does not occur as early as in the tubal form. The foetus occasionally escapes into the uterus, to be at once expelled, or to go on to full term. Rupture however in this case most frequently occurs into the abdominal cavity, followed by profuse hemorrhage, which usually terminates the patient's life.

Rupture of the sac. The time at which this may occur depends upon the location of the placenta, and to a certain extent upon the attachment. In tubal pregnancy, primary rupture occurs usually between the second and fourteenth weeks. The rupture is owing to thinning of the walls of the tube beyond their limits of elasticity by hemorrhage or by gradual enlargement of the embryo; or it may occur as the result of traumatism. If the patient survives the primary rupture, the foetus may continue to develop, either burrowing down between the layers of the broad ligament or extending upward into the peritoneal cavity. The blood, if poured out into the peritoneal cavity, will usually be absorbed; if the hemorrhage occurs between the layers of the broad ligament, it constitutes an extra-peritoneal pelvic hæmatocele. After the twelfth week the sac is liable to secondary rupture at any time up to term, and here again the situation of the placenta is of the same importance in the prognosis as in the primary rupture.

The foetus. The question as to the possibility of life for the foetus is influenced by the location of the placenta. In the tubal variety, the most favorable attachment of the placenta is on the floor of the Fallopian tube, as there may be slight if any disturbance of the foetal circulation if the

rupture be in the superior wall, and the child may thus go on to full term. In ectopic gestation, even should the child be delivered alive, it is often deformed, puny, and rarely survives more than a day or two. Should the mother survive rupture, and the embryo die, it may be completely absorbed as it lies in the abdominal cavity, up to the second month; after that it either undergoes *mummification*, *calcification*, or is converted into *adipocere*, or it *decomposes*.

Mummification is similar to that change which bodies undergo in a dry atmosphere. The fluid constituents are absorbed, and the soft tissues become leathery, or parchment like. In other cases the fatty elements are converted into adipocere. Either the mummified or the adipocere foetus may become partially or wholly calcified, and is then known as a lithopedian. The foetal mass may remain for a long time in the abdominal cavity, but should pyogenic organisms gain access to the sac from a neighboring organ, the foetus will be converted into a putrid mass which may be discharged into the rectum, vagina, or bladder.

Symptoms. All the symptoms of normal pregnancy may, though not always, be present. In some cases, instead of amenorrhœa there will be profuse metrorrhagia with expulsion of some bits of decidua. This symptom is not to be confounded with membranous dysmenorrhœa, already referred to when speaking of that disorder. Pain is variable, in some cases it is almost constant, and in others absent. When present before rupture it may be sharp and lancinating, or a dull heavy aching. Changes occur in the external genitals similar to those in normal pregnancy, together with softening of the cervix. On examination, the Fallopian tube of one side will be found enlarged, and, if far advanced, will be forced from its normal position. Should pregnancy have advanced to the third or fourth month, a tumor with a well defined area of dullness on the anterior abdominal wall may be made out

by percussion. By vaginal examination the tumor will be found lateral, and at one side of the uterus with a sulcus between them.

Rupture. The symptoms of rupture are very pronounced. A patient in previously good health, complaining only of some mild form of disturbance, and possibly with some of the earlier symptoms of pregnancy, is suddenly seized with severe lancinating, cutting, or agonizing abdominal pain. If the hemorrhage is extensive, she may fall almost as unconscious as if struck a blow. Soon there are the usual symptoms of severe internal hemorrhage, indicated by a rapid or almost imperceptible pulse, quickened jerking respiration, air hunger, vertigo, nausea and vomiting, and dimness of vision. These symptoms soon merge into those of profound shock, the extremities becoming cold and clammy, the skin pale, the conjunctivæ pearly, and the face drawn. Death may follow at once, or it may be delayed for a day, or even longer. In some cases the hemorrhage ceases for some time, to begin some days later and then prove rapidly fatal.

When rupture occurs into the broad ligament the initial attack is similar, but the subsequent symptoms are not so urgent, and the hemorrhage will soon cease from its own pressure. Should the embryo die there may be no further trouble, but often the foetus continues to develop, and sooner or later a secondary rupture occurs.

In those rare cases which go on to full term, labor like pains, closely resembling normal labor, come on, and may continue for hours, or even days, and then cease. During this time escape of blood, and of portions of the decidua occur in a majority of cases.

When the patient survives rupture the sharp labor like pains subside, the breasts diminish, the tumor decreases rapidly in size, and she may regain her health in time,

absorption, or one of the other changes that render the foetal body innocuous, taking place.

Diagnosis. A careful review of the clinical history will often lead to a suspicion of the condition. A multipara, who, perhaps, has not borne any children for some years, and probably has had in the meantime an attack of salpingitis and pelvic peritonitis, develops the early symptoms of pregnancy. There will be more or less dull ovarian pain, which continues until it terminates in the paroxysms of rupture, and which, if not fatal, is followed by marked anæmia. A bimanual examination, taken in conjunction with this clinical history, will point certainly to the nature of the pregnancy.

A retroverted gravid uterus may give rise to misleading symptoms, but a careful vaginal and rectal palpation will make out the enlarged fundus.

Ovarian tumors and enlargement of the Fallopian tubes associated with intra-uterine pregnancy, may lead to error, but the fever which accompanies pyosalpinx in the majority of cases will mark the difference. If it be impossible to arrive at a definite conclusion, it is justifiable to recommend exploratory cœliotomy. The *rupture of a pyosalpinx* may be mistaken for a ruptured tube, but when such occurs, the clinical history is entirely different. the pulse is not so rapid, the temperature rises rapidly and steadily, the patient does not present such marked symptoms of loss of blood, but shows early signs of sepsis. It can scarcely be expected to differentiate between the tubal, ovarian, and the secondary abdominal form, when anatomists fail to agree concerning them when the abdomen is opened.

Treatment. *Before rupture.* The electrical treatment, once so much advocated, has fallen into disrepute on account of the uncertainty of terminating foetal life, and its dangers to the mother. Nevertheless, as stated before, when speaking of the practical application of

electric currents, its use may be considered justifiable when the patient is far removed from skilled hands, or when the patient positively refuses to submit to cœliotomy. Should this procedure be decided upon, the transmission of the faradic current is accomplished by passing one pole into the rectum or vagina as far as the site of the ovum, and placing the other on the abdominal wall over the ovary. The full force of a one-celled battery is turned on for a period varying from five to ten minutes. The treatment should be continued daily for one or two weeks.

Injections of solutions into the sac, such as half a grain of morphia, for the purpose of destroying the foetus, have also been tried and advocated.

Undoubtedly when a diagnosis has been made previous to rupture, the proper course to pursue is the removal of the affected tube. Cases with a history suggestive of ectopic gestation, and a mass lateral to the uterus detected by vaginal examination, should be operated upon without hesitation. A proportion of such cases may prove to be pyosalpinx or hydrosalpinx, but the error is not a serious one, as in either instance operation is indicated.

At time of rupture. If the patient is seen at the time of, or immediately after rupture, the obstetrician must exercise much judgment in arriving at a decision. Should examination make certain that hemorrhage has occurred into the broad ligament, the method of treatment should be an expectant one, the possibility being that the hemorrhage will soon cease, if it has not already done so. Should examination reveal free fluid in the cul-de-sac, and there are no signs of improvement in the patient's condition, intra-peritoneal rupture has doubtless occurred. In such a case operation is indicated, provided there is sufficient vitality left for it to be undertaken with any degree of success. In any case attention should be directed towards arresting the hemorrhage, overcoming the shock, and sustaining the patient. Injections of

strychnine and brandy may be given hypodermatically, and infusion of normal salt solution injected into the radial artery or pectoral region, if the necessary appliances are at hand, or if not, into the rectum in the form of an enema.

Operation. After opening the abdomen clots should be turned out as rapidly as possible, and the ovarian and uterine arteries caught either with forceps or the fingers. If while clearing the pelvis fresh blood wells up, the bleeding points must be exposed, and hæmostatic forceps applied. Having controlled active hemorrhage, the rest of the operation, if pregnancy has advanced as far only as the first or second months, may consist merely of salpingo-oophorectomy. If, however, gestation has further advanced, attempts at removal of the placenta are exceedingly hazardous, and the hemorrhage following its dislodgement may defy control. No means further than those necessary to save life at the time of the operation should be undertaken, and consequently the best course to pursue in such cases is to check the hemorrhage, cut the cord close to its placental origin, and leave the placenta undisturbed, to be removed by absorption or by subsequent operation. Drainage should not be employed as it increases the danger of sepsis.

After rupture. Should there be a history of previous rupture occurring at the first or second months after gestation, operation should not be performed unless the foetus has continued to grow. If the life of the foetus has not been destroyed at the time of rupture, the operation should be performed as soon as the patient has recovered from the primary rupture. As the dangers of operation greatly increase as the pregnancy advances on account of the development of the placenta, the earliest date possible should be selected. If the pregnancy is in the early weeks, the operation may be no more difficult than salpingo-oophorectomy for hydrosalpinx, and is somewhat similarly performed. If pregnancy has further advanced,

and adhesions have formed between the gestation sac and the adjacent viscera, or if it is a broad ligament gestation with the placenta firmly implanted on the pelvic floor, the operation becomes exceedingly difficult. The adhesions should be dissected off carefully, bleeding points ligated, and the sac enucleated in the ordinary way.

Evacuation of the gestation sac through the vagina. After carefully examining the mass and deciding upon the most accessible point for evacuation, usually in the fornix, a pair of blunt-pointed forceps are thrust into the sac, and with the blades opened are partially withdrawn while the sac is being steadied from above. The embryonic debris is evacuated with the finger inserted through the opening, after which the sac may be washed out with a weak solution of bichloride, and afterwards packed with gauze.

CHAPTER XXXI.

PELVIC HÆMATOCELE AND PELVIC HÆMATOMA.

The mere effusion of blood (intra-pelvic hemorrhage) into the pelvic cavity should not be confounded with hæmatocele, the term pelvic hæmatocele being reserved for encysted collections of blood. When the blood effused and so encapsuled lies within the peritoneal cavity, it is termed *intra-peritoneal hæmatocele*, or simply *pelvic hæmatocele*. When the blood is spread out below the serous membrane, within the broad ligaments, it is called *extra-peritoneal hæmatocele* or simply *pelvic hæmatoma*.

PELVIC HÆMATOCELE.

Etiology. The effusion of blood into the pelvic cavity may arise from the tubes at the regular menstrual period, the hemorrhage taking place from its distal end, and generally presupposes the existence of salpingitis. In such a case the amount effused may be comparatively

small, and may undergo absorption, or may become encapsuled from inflammatory adhesions. Subsequent tubal hemorrhages may increase the size until the hæmatocele may attain considerable proportions. The most common origin is recognized by all to be the early rupture of an extra-uterine pregnancy, and by some it is stated to be the only one. Other causes are assigned, such as rupture of varicosities of the utero-ovarian plexus, disorders of ovulation, abortions in connection with peritoneal adhesions, hæmatosalpinx or ovarian hæmatoma,



FIG. 106.—Retro-uterine hæmatocele.
U. Uterus. R. Rectum. A. Blood-clot.

atresia of the cervix or vagina, and the rapid evacuation of the uterus for hæmatometra.

The tumor is usually situated in Douglas' cul-de-sac. At the outset the blood is liquid and forms a sort of lake, but the cyst, however, is rapidly formed, and is then entirely separated from the mass of intestines. In this way it is often difficult to distinguish the arch formed by the new membranes from

an uplifted peritoneum. The uterus is pushed towards the symphysis and the sac is adherent in front to its posterior wall, and to the agglutinated intestines which lie upon it. The sac contains a mass of coagulated, or syrupy semi-liquid blood, according to the length of time the lesion has existed. Even in cases where there is reason to suspect tubal pregnancy as the cause, it is not usual to find any piece of the foetus, as it usually disintegrates and is absorbed.

Symptoms. The appearance of hæmatocele is usually associated with symptoms characteristic of its production, such as those connected with the uterine appendages, or ectopic gestation. It is seldom that the effusion of blood

is not ushered in by some decided disturbance. In the most severe cases, there may be those which have been mentioned as characterizing ruptured tubal pregnancy. In less severe cases there may only be local pain, and a sensation of weakness, accompanied by an increase in the size of the abdomen; or the oozing of blood may be so insidious that the symptoms may be imperceptible. On making a vaginal examination, a fluctuating tumor will be felt in Douglas' cul-de-sac which pushes the uterus upward so that the cervix is reached with difficulty, and when felt is found flattened against the pubes. By bimanual examination, the uterus can be outlined and seems to be incased in the mass which fills, or more than fills the pelvis.

The course of the disease is essentially chronic, but successive attacks at times occur. In the most favorable cases, the patient is unable to walk for many months, and is exposed to repeated attacks of peritonitis, during which the tumor is subjected to change of size, and finally diminishes by degrees. Instead of this the tumor may remain for an indefinite period, with but little change in the syrupy chocolate colored contents. Suppurative inflammation may set in, and the mass may be converted into an abscess cavity, which increases its size and softness. Perforation into the abdominal cavity is rare, but perforation may take place into the rectum, by which the whole mass may become evacuated and complete recovery follow.

Diagnosis. The sudden appearance of a retro-uterine tumor coinciding with the phenomena of internal hemorrhage is almost pathognomonic. It might be mistaken for a ruptured pyosalpinx or a retroverted gravid uterus, but the diagnosis of these conditions has already been referred to in the chapter on ectopic gestation. Ovarian cysts and uterine fibromata have nothing in common with hæmatocele, their manner of appearance and course are entirely different.

Treatment. Active interference is justified only by the appearance of accidents which may endanger the life of the patient. If seen at once, absolute rest in bed is demanded, and ice may be applied over the lower abdominal region. Antisepsis of the vagina is to be attended to, to avoid all danger of infection through that channel. It is best to leave the disease to itself, so long as it follows a regular and progressive course towards absorption. Should such not occur within a moderate limit, or the patient's life is threatened by compression or inflammatory phenomena, rapid evacuation of the cyst becomes obligatory.

Incision is preferable to puncture, and the site of the incision is to be determined by the protrusion of the tumor. If it projects plainly into the posterior cul-de-sac, it should be opened through the vagina. By the use of retractors the field of operation is enlarged as much as possible, and an incision is made following the axis of the tumor, care being taken not to injure the ureter by going too far forward in the lateral fornix. The finger in the rectum will serve as a guide in avoiding the intestine. After reaching the interior of the cyst, the opening may be enlarged and the contents carefully evacuated with the fingers, or by antiseptic injections. After clearing out the cavity, it may be loosely filled with strips of iodoform gauze, which will prevent further hemorrhage and complete the process of disinfection. The strips may be allowed to remain for forty eight hours. When removed the irrigation may be renewed, and drainage kept up by strips of gauze inserted into the opening in the cyst cavity, and by a few pieces inserted loosely into the vagina.

Cœliotomy has given good results. The walls of the cyst, if possible, are to be fixed to the abdominal parietes by careful suturing, and the margins protected with pads of iodoform gauze. The cyst wall is then incised, emptied of its contents, and packed with gauze. Such fixation of the walls is often impossible, in which case the intestines

are to be carefully tucked away, and the general abdominal cavity thoroughly walled off with several thicknesses of iodoform gauze. When this has been carefully and accurately done, an incision may be made into the sac, and the contents removed by means of sponges. The cyst cavity may be then packed with iodoform gauze, and the occlusion pads previously inserted allowed to remain *in situ* until sufficient peritoneal adhesions have formed around them to permanently wall off the peritoneal cavity, and with it the intestines, from infection. By this means also capillary drainage is established, and the broken down material of the cyst cavity removed. In course of time the gauze is gradually withdrawn, preserving careful antisepsis, and a smaller quantity reinserted each time until the cavity is completely filled up by granulation.

PELVIC HÆMATOMA.

The effusion of blood into the connective tissue of the pelvis has also been designated by the term *thrombus of the broad ligament*.

Etiology. It may be produced by the influence of pregnancy, or by rupture of a utero-ovarian varicocoele. The immediate attack is usually the result of overwork or sexual excesses during pregnancy or the menstrual period.

Pathology. The blood may form a circumscribed tumor between the folds of the broad ligament, which not being a closed cavity, but communicating with the pelvic cellular tissue, permits the escape of blood, if abundant, into the latter, and the effusion then is directed toward the vagina and rectum. The tumor is usually of medium size, varying from the size of the fist to that of a man's head. The locality is decidedly lateral, and the contents similar to that described when speaking of intra-peritoneal hæmatocele.

Symptoms. It usually occurs in women who are apparently in a healthy condition. Sharp pain in the

abdomen marks the onset, accompanied by a tendency to syncope. Symptoms of decided anæmia, and troubles due to compression of the bladder are manifested, with swelling and tenderness of the abdomen. By bimanual examination, a tumor soft and pasty in consistence is felt in the broad ligament, and not in Douglas' cul-de-sac. The uterus is situated upon its internal surface and more or less pushed aside, but it can be distinctly outlined on every side. As for the other symptoms, they are the same as those given for intra-peritoneal hæmatocele.

Treatment. Expectant treatment is the rule. If the gravity of the symptoms calls for interference, vaginal incision may be dangerous owing to the possibility of wounding the uterine artery or the ureter. In such cases, cœliotomy may be performed, with evacuation and drainage as described for intra-peritoneal hæmatocele.

It may be evacuated by a combined operation of cœliotomy and drainage through the vagina. After opening the abdominal cavity and protecting it after the manner already described, the sac is carefully incised and the contents removed. Guided by the fingers of one hand in the vagina, an opening is made through into that canal. The sac is then loosely packed with strips of iodoform gauze, the ends being brought out through the vaginal opening, and drainage established by that route. The edges in the upper opening in the sac are then inverted and drawn together by a continuous catgut suture and protected by gauze. The management of the gauze within the peritoneal cavity will be the same as already described.

CHAPTER XXXII.

GENITAL TUBERCULOSIS.

Tuberculosis of the female genitals, although long known, has only recently attracted special attention. It was previously known only as a concomitant of advanced phthisis, and it was not until cœliotomy demonstrated its frequent occurrence, either alone or in combination with tubercular peritonitis, that its clinical importance began to be appreciated. It may involve any or all of the various parts of the genital tract, though some portions are more frequently affected than others, the order of frequency being the tubes, uterus, ovaries, vagina, cervix, and vulva.

Etiology. Tuberculosis of the genital tract may be either *primary* or *secondary*. Primary inoculation may occur when the patient has been much in the company of one suffering from tuberculosis. The clothes, a sound, or the fingers of a physician may carry the germ. Cohabitation with a person who has either genital or pulmonary tuberculosis is a well authenticated cause in many instances. The puerperal state has a large share in primary infection, but whether infection can come through the semen, the saliva, or the blood of a scratch, is a disputed point.

Secondary genital tuberculosis is that which is developed in the course of tubercular degeneration of other organs, especially the lungs. In the great majority of cases, genital tuberculosis is secondary and metastatic, the infection taking place by way of the peritoneal cavity and the lymph channels, from the abdominal viscera, or through the general circulation from distant organs, or by auto-inoculation from the secretions.

Vulva. Vulvar tuberculosis is the least common, and is often unassociated with tuberculosis of other portions of the genital tract, being due either to blood infection or

to direct infection. The tuberculous ulcers may attain a considerable size and are usually shallow. Their margins are irregular, sharply cut, slightly raised above the general surface, and of a more or less granular appearance.

Vagina. Vaginal tuberculosis is much more frequent, and while it may be primary, it is usually secondary to tuberculosis affecting the higher portions of the genital tract. It occurs in the form of miliary tubercles, never larger than millet seeds, and which in time undergo caseation and break down, producing tuberculous ulceration. The ulcers thus formed are irregular in outline, their margins sharply cut and perpendicular, the base shallow, studded by granulations of varying size and color, and covered by a layer of caseous material. These ulcers by extension may perforate the walls upon which they are situated and lead to the formation of fistulæ. It is generally limited to the posterior wall of the vagina, and does not ordinarily extend below the upper third, circumstances which are explained by the fact that infection generally takes place by secretions from the tuberculous uterus or tubes.

Uterus. Tuberculosis of the uterus is not a rare affection. It is generally associated with tuberculosis of the tubes from which it has usually originated, and is frequently secondary to phthisis, or occurs as a part of a general infection. It is nearly always limited to the corpus uteri. When tuberculosis of the cervix occurs, it is usually without any involvement of the body, and appears either in the form of miliary tubercles, or of tuberculous ulceration, or as a combination of both forms. It is at first limited to the endometrium, but later the muscular coat becomes involved. The formation of the miliary tubercles occurs just beneath the epithelium of the endometrium, and may or may not be combined with inflammatory changes. The appearance of the tubercles, and of the ulcerations resulting from them, does not differ

essentially from that observed in tuberculosis of other mucous membranes.

In chronic diffuse tuberculosis, the interior of the body of the uterus is filled with caseous material which forms a layer over its inner surface. On scraping it off the subjacent tissue is seen jagged and irregular, and studded with tubercles in all stages of development, from the typical grayish semi-transparent nodule, to the irregularly shaped ulcer. As the disease progresses, tubercles are gradually formed in the muscular coat, which accordingly undergoes hypertrophy, and leads to a considerable en-

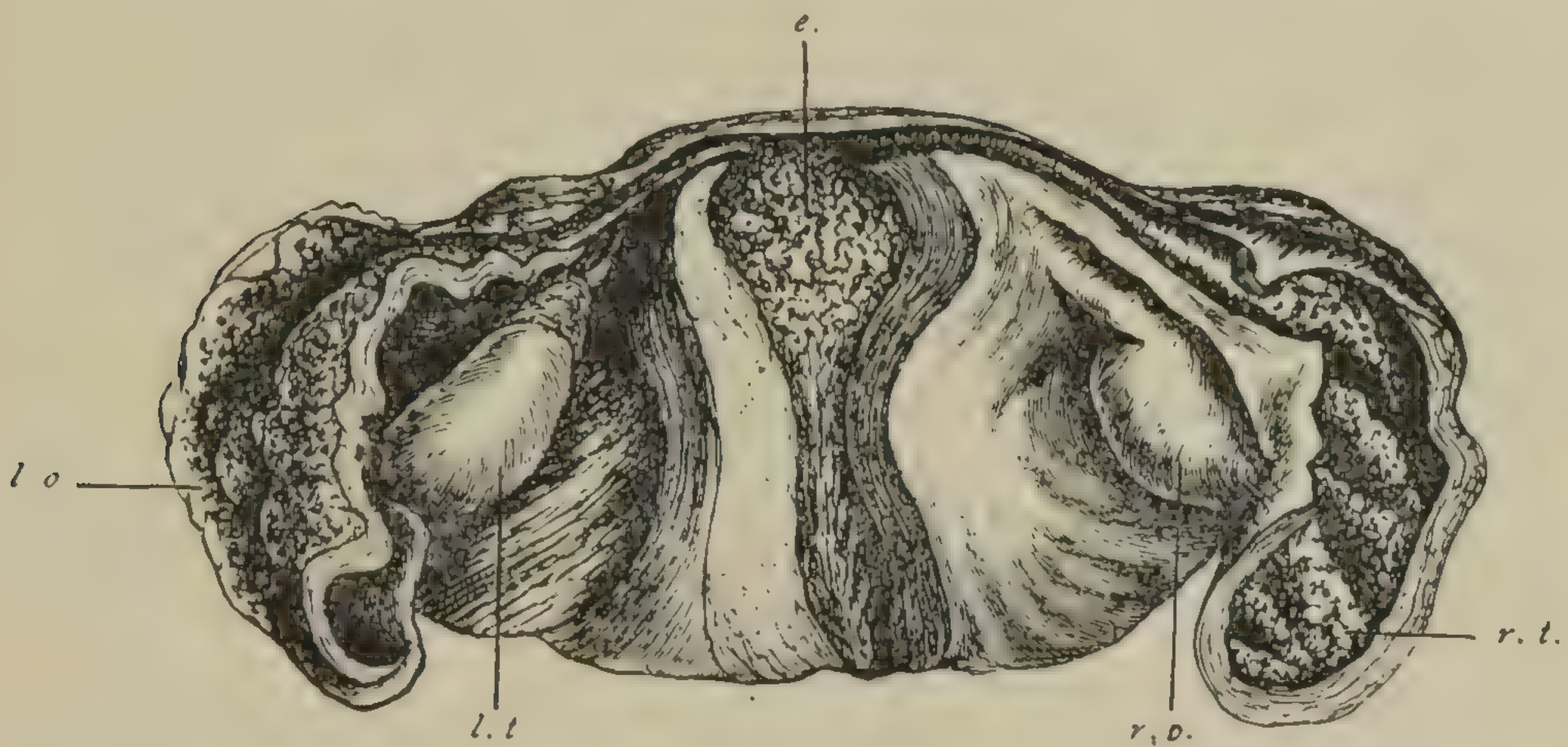


FIG. 107.—Primary tuberculosis of the tubes and ovaries, posterior view. (*Kotschau.*)
r.o. Right ovary, enclosing caseous masses evacuated by the tearing apart of adhesions.
r.t. Right tube, dilated and adherent to ilium, having formed part of the wall of a tuberculous abscess. The left ovary, tube, *l.o.* and *l.t.*, and endometrium, *e.*, are also tuberculous.

largement of the uterus. By obliteration or clogging up of the cervical canal, it may lead to the formation of a pyometra.

Tubes. The Fallopian tubes are far more frequently affected by tuberculosis than any other portion of the genital tract, and in the great majority of cases either the uterus, or the ovaries, or both, are likewise affected. In most cases it is secondary to tuberculosis elsewhere, although in a considerable number of cases they are the seat of the primary form.

Tuberculosis of the tubes may occur in two forms. *Miliary tuberculosis*, in which the tubes present the general characteristics of miliary tuberculosis of other mucous membranes, and *chronic diffuse tuberculosis*, which corresponds to the like named process in the uterus, and is the form familiar to all under the name *caseous pus tubes*.

In advanced cases the tube is greatly enlarged, and if the peritoneum is involved, its external surface is studded with tubercles in various stages of development. It is densely adherent to the surrounding structures, and in some cases presents an almost stony hardness. In most instances the fimbriated extremity is occluded, but when patulous caseous material will be found protruding from it. On section the lumen is found more or less dilated and filled with typical yellowish caseous material, which varies greatly in consistency, sometimes being fluid, sometimes it forms a soft mass, and occasionally is dry and solid or even calcified. The normal appearance of the mucosa has disappeared, and presents a ragged, ulcerated surface over which are strewn tubercles in all stages of development.

A third form of tuberculosis of the tube has been described, *chronic fibroid tuberculosis*. It differs from the others in the excessive formation of fibrous tissue in and between the tubercles.

Ovary. Tuberculosis of the ovary is comparatively rare, and when seen is usually found in combination with other forms. The process may be limited to the surface of the ovary, or it may invade the entire organ. Macroscopically it appears in the form of miliary tubercles, caseous masses, or tubercular abscesses.

Symptoms. No period of life is exempt from genital tuberculosis, but the period in which its occurrence is most frequent is that of the greatest sexual activity. The early symptoms are often not very clear, or so masked by

those of the primary affection that the involvement of the genitals is not suspected. When it occurs in the vulva and vagina, it gives rise to symptoms common to all ulcerative processes, and in these instances simple inspection is frequently all that will be required, but a positive diagnosis can be made only by the microscope.

Tuberculous ulceration of the cervix may show itself by profuse hemorrhage, and in that way may be mistaken for carcinoma. In cases in which the uterus is affected there is usually a very profuse leucorrhœa, which in some instances consists of a mixture of the caseous material and the ordinary secretions. The uterus will be found enlarged, and there will be associated with it menstrual disturbances.

The symptoms produced in tuberculous disease of the ovaries and tubes are in most instances overlooked in the general condition, and even no symptoms at all may be present. When the process is limited to the tubes and ovaries, the symptoms will vary from those of a simple salpingitis to those of the most severe form of pelvic abscess, and in spite of careful examination nothing will be found to indicate the tuberculous nature of the affection. Amenorrhœa is not necessarily an accompaniment, but if it occurs it is usually due to the coexisting phthisis.

Diagnosis. From the clinical history afforded, it becomes evident that prior to the discovery of the tubercle bacillus a positive diagnosis of genital tuberculosis could not be made.

Tuberculosis of the vulva and vagina may be confounded with *granular vaginitis*. When the frequency of the latter is compared with the rarity of the former, it is in itself almost sufficient for a diagnosis; but when one considers that when tuberculosis of the vagina occurs it is in phthisical women, and that granular vaginitis is frequently associated with pregnancy or gonorrhœa, a mistake should not occur. Tuberculosis should also be

diagnosed from the *papular* and *ulcerative syphilides*, which may be done by the history, by the entire absence of pain, and by the total disappearance of the latter under antisyphilitic treatment.

Herpetic eruptions about the vulva occur as small cysts filled with clear fluid, and usually appear about the menstrual period, and disappear soon after. *Hard* and *soft chancres* may be diagnosed by the history, by the appearance of the patient, and by their well known characteristics.

Tuberculous ulceration of the cervix may be diagnosed from *carcinoma* by the aid of the microscope. In tuberculosis of the uterus, and in all cases where there is the slightest suspicion of genital tuberculosis, the vaginal and uterine secretions should be inspected with the greatest care for tubercle bacilli. The diagnosis of tuberculous disease of the tubes and ovaries is more difficult than that of tuberculous disease of the uterus, for the reason that their secretion is not so readily obtained for examination, and it is doubtful if, when the disease is limited to these organs, a positive diagnosis can be made.

Diagnosis. Primary tuberculosis of the genitals is always to be regarded as a serious affection, as it always presents the possibility, as do other foci of tuberculosis, of a general infection, with its uniformly fatal termination. Tuberculosis of the tubes and ovaries tends to the production of tubercular peritonitis, or it may go on to the formation of an abscess in them. The results of operative treatment have been quite satisfactory. If the tuberculosis is limited to the tubes and ovaries, the prognosis after removal will hardly be more grave than if they were removed for the usual inflammatory affections.

Treatment. Remembering the sources of primary infection, the necessity for prophylaxis becomes apparent. Possible infection by physician or attendant should be carefully guarded against. Persons afflicted with genital

tuberculosis, whether male or female, should be impressed with the dangers of infection by coitus. The treatment will vary according as different portions of the genital tract are affected, and whether the affection is primary or secondary.

Ulcers of the vagina and vulva may be made to disappear by the application to them of tincture of iodine, iodoform, or lactic acid. If a tuberculous ulcer of the cervix is recognised, and fails to respond to conservative treatment, it should at once be amputated. If the process is limited to the uterus, it should be curetted and iodoform suppositories inserted. If there is the slightest recurrence of the infection, the uterus should be removed by vaginal hysterectomy, and in such cases it is best to remove the tubes and ovaries as well.

The question as to the removal of the tubes and ovaries when they are the seat of tuberculosis, is a difficult one. As primary tuberculosis is rarely diagnosed, the propriety of their removal is seldom faced, but when discovered in cases of cœliotomy undertaken for other causes, there should be no hesitation as to the propriety of their removal. In advanced or decided cases of pulmonary phthisis, there should be no thought of operating. In cases associated with tuberculous peritonitis, there need be no hesitation to perform cœliotomy and remove the tubes and ovaries, and uterus as well, unless the general condition of the patient is altogether unfavorable.

CHAPTER XXXIII.

TUBERCULOSIS OF THE PERITONEUM.

In connection with miliary and chronic pulmonary tuberculosis, it is not uncommon to find the peritoneum studded with small gray granulations, and they are constantly present too on the serous surfaces of tuber-

culous ulcers of the intestines. Apart from these conditions the membrane is often the seat of extensive tuberculous disease, which occurs in the following forms:—

Acute miliary tuberculosis, with sero-fibrinous or bloody exudation.

Chronic tuberculosis, characterized by larger growths, which tend to caseate and ulcerate, leading to perforation. The exudate is purulent or sero-purulent, and is often sacculated.

Chronic fibroid tuberculosis, which may be subacute from the onset, or which may represent the final stage of the acute form. The tubercles are hard and pigmented, there is little or no exudation, and the serous surfaces are matted together by adhesion.

Tubercular peritonitis occurs at all ages, and is common in children associated with intestinal and mesenteric disease. The incidence is most frequent between the ages of twenty and forty.

Symptoms. The process may be latent and not cause a single symptom, the condition being accidentally met with during cœliotomy for some other lesion. Sometimes the onset is so sudden and violent that a diagnosis of enteritis or hernia is made. Many cases set in acutely with fever, abdominal tenderness, and the symptoms of ordinary acute peritonitis. Cases with slow onset, abdominal tenderness, tympanites, and low continuous fever, resemble typhoid fever very closely. Ascites is frequent, but the effusion is rarely large, and is sometimes hemorrhagic. Tympanites is generally present, particularly in the more acute cases. Fever is also a marked symptom in acute cases, and the temperature may reach 104° F. In many cases it is slight, and in the more chronic cases subnormal temperatures are common. Associated with this, there is usually abdominal pain, imperfect digestion, loss of flesh, emaciation, sometimes diarrhœa, and occasionally pigmentation of the skin, resembling at times that of Addison's

disease. A striking peculiarity of tuberculous peritonitis is the frequency with which the condition simulates, or is associated with tumor, and is to be remembered when making a diagnosis of abdominal and pelvic tumors.

Omental tumors may form from the puckering and rolling up of this membrane until it forms an elongated firm mass, attached to the tranverse colon and lying across the upper part of the abdomen.

Sacculated exudation may occur, in which the effusion is limited and confined by adhesions between the coils of intestines, the parietal peritoneum, the mesentery, and the abdominal or pelvic organs. This encysted exudate is most common in the middle zone, and has frequently been mistaken for an ovarian tumor. It may occupy the entire anterior portion of the peritoneum, or there may be a more limited saccular exudate on one side or the other. It may be completely within the pelvis proper, associated with tuberculous disease of the Fallopian tubes. In rarer cases the tumor may be due to the great retraction or thickening of the intestinal coils. Not only the small intestine, but the entire bowel, from the duodenum to the rectum, has been found forming such a hard nodular tumor.

Mesenteric glands occasionally form very large tumor like masses, but they are more commonly found in children than in adults.

Diagnosis. The prodromata, the gradual onset, the progressive development, suggest the tuberculous nature of the disease. The presence of extensive induration about the Fallopian tubes, not traceable to labor, abortion or gonorrhœa, and of tuberculous disease elsewhere in the system, aid materially in differentiating it from peritonitis due to ordinary *salpingitis* or *appendicitis*.

Malignant peritonitis is seldom encapsuled, and is more often connected with a tumor or characteristic enlargement of an organ, has less extensive acute attacks, and runs a more rapid course. When tuberculous peri-

tonitis progresses more rapidly, the characteristic symptoms of it will prevent it being confounded with malignant disease.

Encysted tuberculous peritonitis may, as has been said, be mistaken for an *ovarian tumor*. In addition to the local signs of ovarian tumor already mentioned, the presence of salpingitis, the induration of the sacro-uterine folds as felt by the finger introduced into the rectum, the slow development and other signs and symptoms of tuberculosis, will serve to distinguish it. An ovarian tumor with pelvic adhesions presents severe increasing pelvic symptoms, with proportionately less general depression, loss of health and emaciation than tuberculosis.

Treatment. The treatment in general consists in that which belongs to tuberculosis elsewhere. Attacks of peritonitic pain should also be treated on the general principles laid down for peritonitis occurring under other circumstances. Bismuth and salol, the digestive ferments, and a carefully regulated diet may be required for gastrointestinal irritability and impaired digestion. Constipation or diarrhœa should be combated by appropriate treatment. Counter-irritation over the abdomen by tincture of iodine, and later by gentle pelvic massage, may be employed. Encysted peritonitis should be relieved by tapping, or by a short abdominal incision and the insufflation into the sac of a small quantity of iodoform. Drainage is seldom necessary, unless adhesions have been separated that leave oozing surfaces.

PART FOUR.

DISEASES OF THE FEMALE BREAST.

CHAPTER XXXIV.

ANATOMY. THE NIPPLES. NEUROSES. MASTITIS.
MAMMARY ABSCESS. CYSTS.

For a proper consideration of the various affections of the mammary gland, it is essential that there should be a knowledge of its anatomical position, its structure, and its physiological functions. Into these it is impossible to go here, but a few points regarding its blood vessels and lymphatic channels will not be out of place.

The breast receives nearly its entire *arterial supply* from the thoracic branches of the axillary, namely:—The acromio-thoracic, the long thoracic, and the external mammary arteries, all entering the gland from the upper and outer aspect. Branches are sent to the sternal side of the gland by the perforating and intercostal branches of the internal mammary artery. The venous blood returns through the veins accompanying the arterial vessels.

The *lymphatics* of the breast consist of two sets, an axillary and a mediastinal. These are further subdivided into superficial and deep sets. The main lymphatic channels pass either superficially, or deeply, from the upper and outer portion of the gland, the former over, the latter in the fascia which covers the pectoralis major muscle. The majority of these lymphatics bend around the pectoral muscle and enter the glands there; others pass directly to the glands about the axillary artery. Still others, belonging to the superficial set, pass upward and outward, joining first with the lymphatics of the arm before entering the glands about the axillary vessels. The

mediastinal set of lymphatics, consisting of a superficial and deep set, drain the sternal side of the gland, particularly the upper and inner quadrant. They pass into the glands of the anterior mediastinum by perforating the intercostal spaces, those on the right side joining usually with the lymphatics from the convex surface of the liver. A knowledge of the lymphatic distribution is important, particularly in carcinoma, as it explains the common infection of the axilla, and the rarer infection of the mediastinum and liver which may occur in this disease.

Malformations or deformities of the breast are very rare and of no practical importance.

Diseases of the nipple. Apart from inflammatory disturbances, the nipple is rarely affected by disease.

Inflammation may be excited by any irritation, but it is seldom found except during lactation, either early in its course, or when lactation is unduly prolonged. The alternate wetting and drying associated with nursing the child, is the exciting factor. In the milder cases the nipple and surrounding areola are affected only. In severe and neglected cases the process may involve the neighboring skin and underlying fascia, or even the gland itself. This extension is due to the fissuring which opens up the lymph tracts to the entrance of pyogenic micrococci. These micrococci, which are commonly present in the skin and mouth secretions, enter and excite lymphangitis, and by spreading deeply may set up mastitis, either of which may terminate in mammary abscess. In the milder cases the nipple and areola become red and swollen, then fissured, leaving small ulcers, constituting what is commonly termed *cracked nipples*. Pain is always present, usually smarting in character, and intensified during the nursing of the infant. In severe cases the ulceration may extend deeply, leading to considerable destruction of the nipple substance.

Treatment. In the milder cases thorough cleanliness is all that is usually required. Washing the breasts with warm boracic acid lotions, and thorough drying after nursing, will accomplish this. When fissures appear, a breast shield should be worn when the child is nursing, and in the intervals an astringent lotion, such as the glycerole of tannic acid, used. In severe cases the use of the breast will have to be abandoned, the ulcers touched with a caustic, such as the solid stick of silver nitrate, and the breast compressed with a firm bandage after the application of a belladonna ointment or lotion, or better still, perhaps, the oleate of atropine in two-per-cent strength.

Neuroses of the breast are not unfrequently found in young unmarried women. As a rule the condition is most marked at, or about the menstrual periods. This affection is quite a common manifestation in hysterical women. The features usually noted are a peculiar sensitiveness in the gland, at times amounting to pain, neuralgic in character, and usually localized, but may shoot to the arm or shoulder. On examination no departure from the normal can be detected. It is important to examine the breasts carefully for tumor nodules and to exclude these as causal agents.

The *treatment* of these neurotic conditions must be directed to the general health of the patient, no attention being paid to the breasts; in fact attention should be directed entirely away from them, as local treatment usually intensifies the trouble.

Inflammation of the breast. (Mammitis, mastitis, mammary abscess.) Inflammatory conditions of the breast may be either *acute* or *chronic*, but the vast majority of such must be placed in the former category.

Acute mastitis may follow traumatism, but most commonly it is found during the first weeks of lactation, or late in its course, being due to the extension of infective material from cracked nipples. It may also be found in

infants shortly after birth, due to attempts of the nurse or mother to break the "nipple strings;" or at puberty, owing usually to some trauma or irritation of the then sensitive breasts. All cases of acute mastitis, not directly traumatic, are due to the entry of infective bacteria, particularly the pyogenic micrococci, of which staphylococci, *pyogenes aureus* and *albus*, play the chief part. Cold, inefficient emptying of the breasts, irritation from the clothing or other slight trauma, and prolonged lactation are factors predisposing to infection. Infection, though commonly of local origin through the milk ducts or lymph channels, may at times take place by way of the blood current.

The *symptoms* are at first a sense of fulness and discomfort, followed by swelling of the breasts and tenderness, often localized at first to a single lobule or group of lobules. Pain is present, sharp and lancinating, and often shooting to the axilla. The skin next becomes tense, red, and indurated. Constitutional disturbances are manifested by slight chill with subsequent fever. The inflammation may terminate in resolution, or it may pass on to suppuration and the formation of an abscess.

Mammary abscess. When the inflammation terminates in pus formation, the parts, usually localized to a group of lobules, become tense, boggy, and fluctuation appears. In true mastitis pus forms in the gland, but pus may form either over or under the gland. Superficial abscess formation may mean no involvement of the gland tissue, but frequently it is but a forerunner, or rather a concomitant of abscess formation in the gland itself. Pus formation beneath the gland is commonly due to the direct passage of infective pyogenic bacteria to the lymph tracts in that situation, the gland itself being only occasionally involved. In such cases the inflammatory process is behind the gland, and when pus forms the gland is pushed forward and floats, as it were, upon it. Pointing

of the abscess usually takes place at the lower margin of the breast.

Treatment. The treatment of mastitis at periods other than lactation, consists in keeping the gland at perfect rest. This is best secured by bandaging with firm compression the affected breast, and at the same time fixing the arm to the chest. The bowels should be opened by a sharp saline purgative, and kept acting freely. Tonics should also be given. Locally, soothing astringent lotions, as lead and opium wash, should be applied to the breast. If the inflammation tends to pass on to pus formation, these lotions should be replaced by hot fomentations, or by aseptic poultices, such as linseed meal boiled in carbolic water (1 to 80). When pus forms it must be freely opened.

Mastitis during lactation always shows a great tendency to proceed to abscess formation. During lactation, if mastitis develops, the child should be withdrawn from the breast, and distension relieved either by gentle stroking, or by the proper use of the breast pump. The breasts must also be placed at perfect rest by firm bandaging, and other points attended to according to the manner already described. If pus forms it must be evacuated at once.

In opening an abscess in the breast the incision should always be made in a line radiating from the nipple, thus avoiding the milk ducts. The opening should be freely made, the abscess cavity irrigated and packed with a little iodoform gauze, and the skin incision partly approximated. When the abscess is behind the gland, the incision should be made where the abscess tends to point, that is at the lower border of the gland. After evacuation of the pus the cavity should be thoroughly irrigated and drained as before. A rubber drainage tube may be sufficient for such cases, as the dependent position affords in itself good drainage.

Chronic mastitis. (Interstitial mastitis.) Chronic induration of the breast is a proliferative inflammation of

some of its lobules. It may be due to various causes, and there are different varieties. It may be found arising late during lactation, or more commonly in married women after the menopause. In both these conditions it may be mistaken for carcinoma, and it is well to remember that some of such cases do terminate in carcinomatous formation. Besides these commoner conditions, we may have a chronic mastitis set up by continued irritation of the clothing. *Tuberculosis* and *syphilis* at times attack the breast, usually taking the clinical form of chronic mastitis. Either of these conditions may lead to the formation of chronic or cold abscess of the breast. Abscess formation is at times found in connection with chronic mastitis occurring late in lactation.

In chronic mastitis there is an extensive proliferation of the connective tissue cells, and to a slighter extent of the epithelium of the gland alveoli, with a slight leucocytic infiltration. The connective tissue cells develop into adult fibrous tissue, and by their contraction lead to induration, and to occasional adhesion of the skin and retraction of the nipple. The gland acini are also pressed upon and gradually destroyed. In some parts small retention cysts may be formed by the obliteration of the ducts.

The disease is first noticed as a circumscribed induration in the breast, moving only with the breast tissue, and affecting but one or two lobules at first. The affected area is tender on pressure. Pain, if present, follows the distribution of the intercostal nerves. The indurated area is commonly wedge-shaped, with apex toward the nipple, and gradually increases in size. The induration has not the stony hardness of scirrhus, nor does it become adherent to underlying structures. The axillary glands are at times somewhat enlarged, but never indurated. The skin over the area of induration may become somewhat dimpled, and the nipple retracted, owing to the contraction of the

newly formed fibrous tissue. In a case where the diagnosis between this affection and scirrhus is doubtful, there should be no hesitation in making an exploratory incision, for in this, as in the case of scirrhus, early operation is the only hope for eradication of the disease.

Treatment. Tonics and good food are indicated in most cases of chronic mastitis. Potassium iodide may also be administered, and is essential in syphilitic cases. Locally, various preparations may be made use of, such as a two-per-cent oleate of mercury or iodide of potassium ointment, or belladonna plaster. When used they should be applied with firm pressure, and the treatment continued for some weeks. If pus forms it must of course be immediately evacuated and the cavity irrigated and drained. In cases persisting for months, and in tubercular mastitis, amputation of the breast is called for, as long continued cases, if left alone, are apt to become malignant.

Simple cysts. Cysts may occur in nearly all forms of tumor of the breast, the common cysts being found in connection with adenomata of the breasts, but the cysts to be now considered are those apart from such tumor formation. Of the simple cysts there are two classes:—

1. *Serous cysts*, due to distension of lymph spaces in the connective tissue stroma. They contain a serous fluid and seldom reach a large size.

2. *Retention cysts*, of which there are several varieties. (a) The large duct cysts. (b) Small duct cysts or glandular cysts. (c) Involution cysts.

The duct cyst is due to blocking of one of the larger milk ducts, leading to distension of the duct. Occurring during lactation, such blocking leads to milk cysts or galatocoele. The smaller duct cysts are usually multiple, and are due to dilatation of smaller ducts and gland alveoli, from blocking of the lobular ducts. These cysts contain a yellow, or a brownish yellow mucoid fluid. The third class, or involution cysts, are of very small size, and

occur in elderly people, or as a result of chronic mastitis. They are of no importance. Hemorrhage may occur into any of these varieties, forming a hemorrhagic cyst.

Serous cysts and duct cysts give rise to the same symptoms, and are found most often between the ages of thirty and forty years. They appear as rounded or ovoid swellings, situated usually in the centre of the gland, have an elastic feel, are freely movable, and do not lead to skin adhesion. Galatocoele or milk retention cysts occur during lactation, and are filled with a milky fluid changed by absorption and inspissation.

The *treatment* consists in laying open the cysts and removing the contents. In serous cysts the cavity may be allowed to granulate up from the bottom. In other forms it will usually be necessary to dissect out the cyst wall, or to remove the effected zone entire. In such cases the wound may be sutured and treated as an ordinary incision.

CHAPTER XXXV.

DISEASES OF THE FEMALE BREAST CONTINUED.

NEOPLASMS.

Tumors of the breast constitute the largest class of affections of this organ. Various classifications are given in the larger text books, but the following is here put forward as resting upon a fairly accurate pathological and clinical basis. Tumors of the breasts may be:—1. *Simple or innocent*; 2. *Malignant*. This classification must be further subdivided as follows:—

1. *Benign, innocent, or histioid tumors* made up of:—

- | | | |
|-------|---|--|
| Rare. | { | <p>a. Tissues resembling the fully developed connective tissues, as fibroma, lipoma, chondroma, etc.</p> <p>b. Tissues resembling the more specialized connective tissues, as angioma, neuroma, etc.</p> |
|-------|---|--|

Common simple tumor. { c. Tissues consisting of epithelial elements arranged fairly typically in alveoli, with distinct lumen, and a stroma of fully developed connective tissue, as adenoma and its subvarieties, adeno-fibroma, cyst-adenoma, and papillary cysts.

2. *Malignant tumors made up of:—*

Usual sarcomatous tumor. { a. Tissues of the nature of class, c, in simple tumors, in which the stroma is not fully developed, but embryonic, that is consisting of young forms of connective tissue, adeno-sarcoma and its sub-class sero-cystic sarcoma. The distinction between class, c, and this one is often more pathological than clinical.
 b. Tissues made up entirely of embryonic, that is to say, young forms of connective tissue. Sarcoma (pure).
 c. Tissues made up of glandular epithelium arranged atypically in alveoli, by a connective tissue stroma, and without basement membrane. Carcinoma.

Of all cases of tumor of the breasts, including cystic tumors, over eighty per cent are carcinomatous, and about three per cent sarcomatous, either pure sarcomata or adeno-sarcomata. Thus malignant tumors constitute about eighty five per cent of all breast tumors. Of the remainder, adenomata or their subvarieties constitute nearly the entire percentage.

The simple tumors, fibroma, lipoma, angioma, and adenoma are rare, with the exception of the last named, and as they do not differ from similar tumors situated in other regions, it will not be necessary to refer to them further here.

Adenomata. These tumors are made up of epithelial cell elements, spheroidal or cubical in shape, arranged in alveoli with a distinct lumen and a limiting basement membrane, by a fibrous connective tissue stroma.

Pure adenomata closely resemble the true gland tissue itself, differing however in the aimless arrangement of the alveoli, and the absence of the proper ducts. In the pure form adenomata are rare; commonly we find in such growths a considerable amount of fibrous stroma, constituting *fibro-adenoma*, the common simple tumor of the breast. Other modifications in structure of the adenoma are found constituting further subvarieties. Some of the glandular alveoli may dilate, and their lumen become filled with a serous, mucous, or more rarely, a milk-like fluid, at times somewhat dark in color. These dilated alveoli may themselves enlarge greatly, or more commonly neighboring dilated alveoli run together forming smaller or larger cysts, and constituting the *cystic adenomata* of the breast. Into these cystic spaces proliferous ingrowths of the cystic walls, consisting of the frame work of connective tissue covered with the epithelial lining of the cyst wall, may occur. These ingrowths constitute the *proliferous mammary cysts*, or *papillary cystomata* of the breast, and are analogous to the papillary cysts of the ovary. Cystic adenomata constitute about eighty five per cent of the various cystic formations in the breast. In some adenomatous formations the stroma, instead of being of a type of fully developed connective tissue, contains more or less embryonic or young connective tissue. These are the *adeno-sarcomata* of the breast. At times the epithelial lining of the alveoli of the tumor takes on an atypical course, breaking through the basement membrane, forming atypical alveoli. This is a *carcinomatous* change and though it occurs but rarely, its possibility should always be borne in mind.

Adenoma and *fibro-adenoma* may be considered together. These tumors are found nearly always between the age of puberty and thirty five years, being most common between seventeen and twenty seven. They occur as a rule in otherwise healthy women. The tumor appears as

a slowly growing nodule, commonly in the upper half of the gland; it is freely movable, circumscribed, and rounded, and at times lobulated. The nodules feel firm, and may vary in size from a pea upwards; commonly they reach the size of a walnut, but considerably larger growths may be found. The skin is rarely involved, and if so, only by direct pressure. The growth may become more rapid during pregnancy or lactation. Pain in the nodule is seldom complained of, but there may be uneasiness or slight tenderness in neurotic patients. Shooting pains through the breast are not an infrequent symptom, but the axillary glands are not involved.



FIG. 108.—Fibro-adenoma of the breast. The glandular tissue is badly developed, and is mingled with much fibrous tissue.

Cystic adenoma usually occurs at a somewhat later period than fibro-adenoma, being most common between thirty and thirty five years, though not wholly confined to that period. The tumor grows larger than the simple adenoma, which they resemble clinically, at times reaching one or two pounds. Their later appearance, larger size, their frequent irregularity of surface, and the demonstration of points of fluctuation, are diagnostic features. Many of the cysts are so tense that fluctuation may be most difficult to make out.

The *papillary cysts* present the same general features as the cystic tumors. Often the cysts are so filled with ingrowths that clinically these tumors are solid, and they may even appear, on superficial examination when removed, to be solid fibro-adenomata.

Cystic adenomata do not invade the breast tissue, but pressure may lead to atrophy. The skin may be involved

by pressure of a large tumor, but it is never infiltrated. The glands are not involved except there be some accompanying inflammation, when they may be slightly enlarged and tender.

The treatment of all varieties of adenomatous tumors is excision. When they involve but a small portion of the gland structure, as in most cases of simple adenoma and

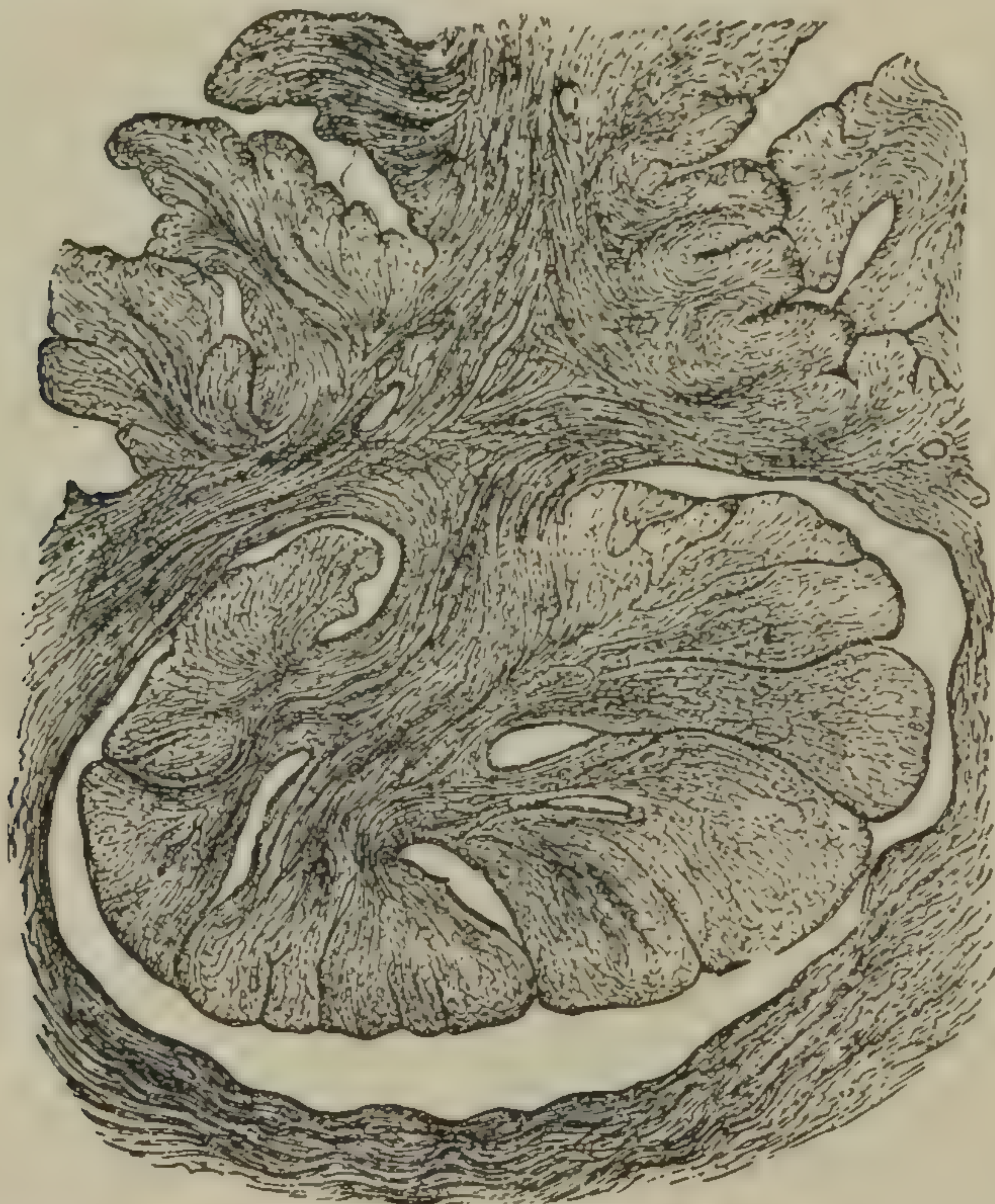


FIG. 109.—Proliferous cyst-adenoma—*a*, termination of an acinus; *b* and *c*, the tissue between the acini taking on increased growth and pushing into and dilating the acini into cysts. (Billroth.)

early cystic trouble, the growth can be excised without injuring the secretive function of the breast. The skin incision in such cases should radiate from the nipple, avoiding the ducts, and should cut to the capsule, when the growth may be either enucleated or dissected away with its capsule. Enucleation is advisable in simple cases, while if cystic change occurs, the latter procedure should be employed. When the tumor is large, or involves the gland tissue extensively, the breast must be amputated.

Recurrence after complete removal does not take place. Further nodules may occasionally appear, but these will have developed from new foci.

Sarcoma and adeno-sarcoma. About three per cent of the tumors of the breast are sarcomata, and the majority of them belong to the mixed variety, adeno-sarcoma, the remainder being derived from the connective tissue without change in the epithelial elements. Sarcomata begin most commonly between the ages of thirty and forty, and attack chiefly the central area of the gland. At first they appear as small, slightly lobulated, freely movable growths, and early it is impossible to differentiate them from adeno-fibromata. The growth, however, is much more rapid, advancing as much in weeks as the simple tumor does in months. The growth soon becomes large, less movable, and often somewhat adherent to the surrounding parts. It is also more elastic, softer, and of more unequal consistence than a simple tumor. In an adeno-sarcoma the glandular part may undergo the same changes as occur in simple tumors, and cysts may thus be formed. Cystic sarcomata rapidly enlarge, and hemorrhage very frequently takes place into the cysts. As a rule, sarcomata of the breast are, until late in their course, distinctly encapsuled. Later they infiltrate the gland structure and involve the skin, which becomes first blueish, and its veins dilated. Later the skin becomes dusky red, and ulcerates, owing both to pressure and infiltration. After ulceration the tumor may protrude as a bleeding fungoid mass. The axillary glands are seldom involved, as dissemination occurs by way of the blood current. Secondary growths are most common in the lungs, and when they occur, are always of the nature of pure sarcomata, even though the primary growth be an adeno-sarcoma.

Treatment. In the early stages the treatment does not differ from that of adeno-fibroma. Later amputation of the breast with free and wide extirpation of the surround-

ing skin, is essential. With early excision recurrence is uncommon, but when the tumor is large, recurrence not infrequently may occur locally, or there may be a general dissemination of the growth. Local recurrences should be freely removed. The prognosis after free excision is fairly good, as about two thirds of the cases show no return. If left alone the tumor has always a fatal issue, due to exhaustion from ulcerative discharges, or from continued hemorrhage, or to general dissemination, or to the cachexia which appears late in the disease.

Carcinoma. Carcinomata, or cancers, comprise the vast majority of new growths in the breast, making up over eighty per cent of the tumor formations in this situation. As compared with neoplasms elsewhere, it also forms a large percentage, comprising seventeen per cent in the extensive series collected by Roger Williams. In the female, the breast and uterus are the usual seats of carcinomatous formations.

Carcinoma may attack the breast in all its varieties, but spheroidal-celled carcinoma is by far the most common, comprising from ninety seven to ninety nine per cent of such formations. All forms of spheroidal-celled carcinoma may be found—*scirrhous*, *encephaloid*, and *colloid*—but scirrhous is the most common form. *Squamous-celled carcinoma* or *epithelioma* may attack the skin surface subsequent to a continued intractable eczema—the so termed Paget's disease. This is very rare, at least in this section. *Columnar-celled carcinoma* originates from the ducts of the breast, comprising the villous or duct cancer.

The spheroidal-celled carcinoma originates from the gland structure itself, and its varieties, scirrhous, encephaloid, and colloid, are differences only in the amount and character of the epithelium as compared with the stroma. The larger the number of epithelial cells, compared with the stroma, the softer will be the growth, and the more malignant its character; the more embryonic in character

the epithelial cells, the more rapidly will they tend to disseminate. Colloid cancer consists of a colloid degeneration of the epithelium of scirrhous or encephaloid, a degeneration which lessens their malignancy very materially.

In the causation of cancer of the breast there are the same factors which appear to predispose to it elsewhere. A family history of the disease is occasionally obtained.

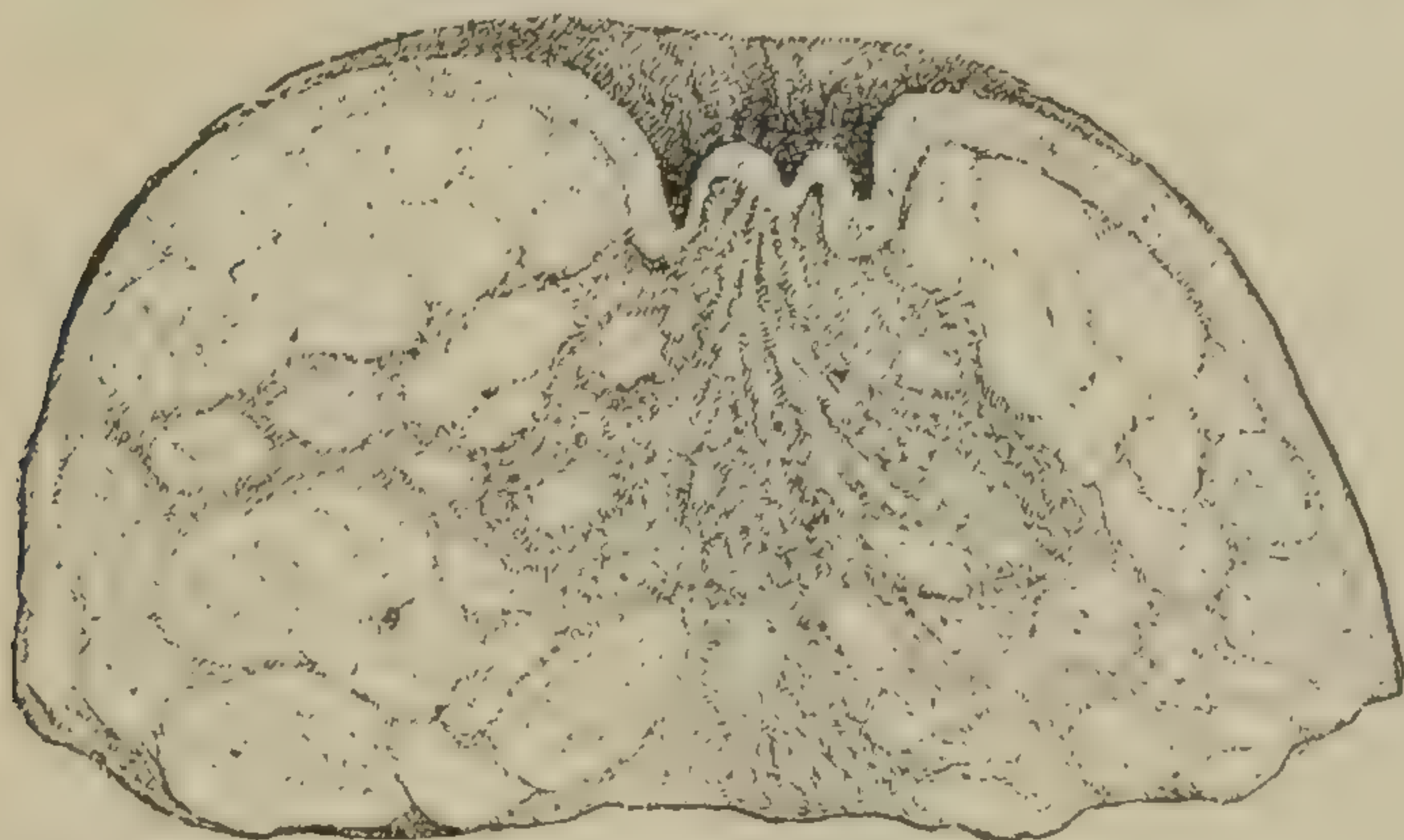


FIG. 110.—Section of a breast with scirrhous carcinoma. The growth infiltrates the fat, and has caused retraction of the nipple.

Cases have been frequently recorded as following some traumatism. Long continued irritation, particularly when accompanied by proliferative (chronic) inflammation, as in chronic mastitis, is the most important predisposing causal factor. In the breast, as elsewhere, the actual causal agent of this distressing affection has not been found.

Carcinoma is most frequently found towards the periphery of the gland, particularly in the upper and outer quadrant of the organ. No part is however free from attack. It is most common in women over forty, and more especially about the menopause. The vast majority of cases are found between thirty six and fifty two years, but cases are at times found in younger, and not infrequently in more elderly women. The softer, or encephaloid variety, is more apt to occur in younger patients,

than scirrhus. As scirrhus is by far the most common form found, it alone will be completely described.

Scirrhus usually commences as a small rounded firm lump, which is at first movable, and commonly painless. Its early growth is slow, but later it becomes hard, nodular and less movable, or moving only with the entire breast. The outlines of the growth are ill defined, merging into surrounding mammary tissues and fat. Later the tumor approaches the skin, causing dimpling, and then

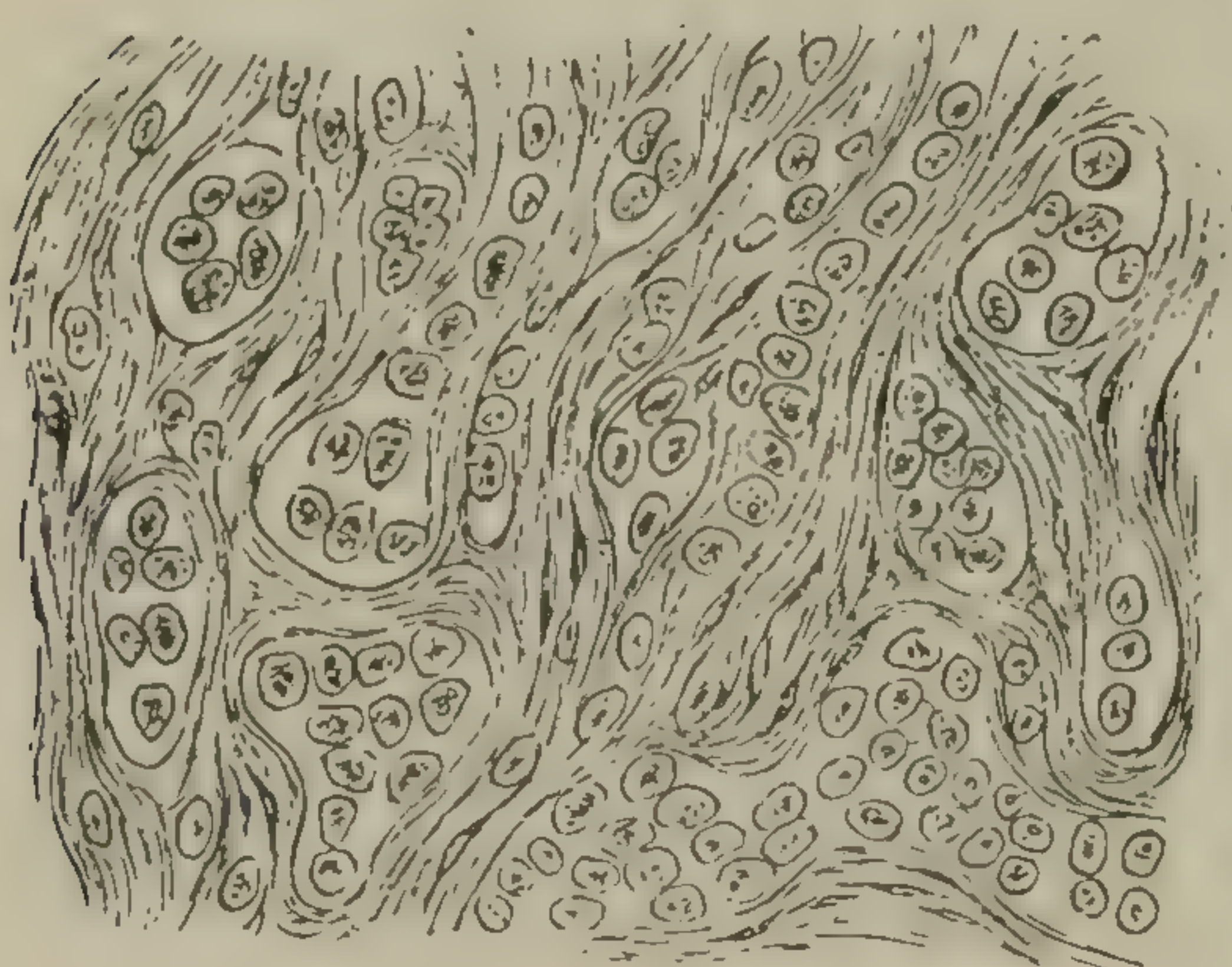


FIG. III.—Scirrhus carcinoma of the breast.

puckering, while later still the skin becomes densely adherent, and finally may ulcerate. This involvement of the skin differs considerably from that of sarcoma or adenoma, for while in them the skin is first stretched and thinned by pressure before adhesion and ulceration occur, in cancer there is

puckering due to contraction of the newly formed fibrous stroma in the invaded fibrous septa stretching from the skin to the fascia covering the gland. The tumor sooner or later, by downward extension, becomes adherent to the pectoral muscle, and is then quite fixed. Later it may infiltrate the muscle fibre, and even pass through the intercostal spaces to the pleura.

The nipple commonly becomes retracted, the retraction usually commencing somewhat sooner than the skin dimpling. This retraction is due to the contraction of the fibrous walls of the milk ducts from invasion of their walls by the growth. The retraction is a true one, not like that occasionally seen in other tumor formations, where the nipple lies buried by the tumor mass. It is to be remembered that retraction of the nipple is not always

present, and further that it is often a late sign. At times a milky fluid can be expressed from the nipple, but this symptom may also be present in adenoma.

Pain is absent in the early stages of growth, but later becomes manifest, at first slight and stinging, but later more severe sharp and cutting, and often shooting to the axilla. This pain is almost constantly complained of, but in rare cases entire absence of pain may be noted.

The axillary glands are affected early in the disease by extension to them, through the lymphatics, of epithelial cells from the breast nodule. These glands become enlarged and tender, and though at first not palpable, later appear as shotty nodules. The glands along the lower border of the great pectoral muscle are first involved, and later those about the axillary vessels and brachial plexus. Owing to pressure on the axillary veins, œdema of the arm often follows, while pressure on the nerves will cause severe neuralgic pain along their course. From the axillary glands there may be extension to those above the clavicle. In such cases the disease is usually considered to be beyond operative interference. At times extension occurs to the glands of the anterior mediastinum, and on the right side, to the liver. General dissemination may occur in the bones or viscera. In all cases of cancer of the breast, a careful examination should always be made of the axillary, supraclavicular, and anterior mediastinal glands, and of the lungs and liver.

After adhesion of the tumor to the skin, little nodules may develop there; and it, in its turn, will become red, glazed and finally break down at some point. The skin all about the ulcerated and adherent portion becomes puckered and drawn towards it. In the ulcerated portions, a protruding fungus rarely forms; more commonly there may be an ulcer with raised, everted, stony hard margins, and a rough irregular sloughing base, which bleeds readily. By the time the skin has ulcerated and the

axillary glands have become enlarged, there will be development of the cancerous cachexia. Death may be due to exhaustion from hemorrhage and local discharge, from general dissemination of the growth, or from involvement of a vital organ, or to some secondary infection or complication.

Some exceptions should be made to these general statements regarding scirrhus. In some rare cases the growth may not begin as a localized nodule, but affects, as a diffused growth, almost the entire breast. In some cases known as atrophic or withering scirrhus found at times in quite old women, the growth shows great shrinking and density, and is of slow formation. This growth has not so much tendency to invade the glands, but general dissemination may occur.

Cases of scirrhus of the breast, when untreated, have an average course of thirty months; many cases do not run more than eighteen months, while others may be prolonged for three or four years.

Encephaloid carcinoma is very rare, and runs a much more rapid clinical course than scirrhus, a few weeks to about fifteen months being the limit. It occurs as a rule in younger patients, grows more rapidly, forming a large tumor in a few months. It soon involves the skin and glands, and rapidly disseminates in the internal organs or bones. Occasionally it attacks both breasts at the same time, and is then most rapidly fatal.

Colloid carcinoma is a carcinoma in which the epithelial cells are undergoing colloid degeneration. Such cancers are of slow growth, do not involve the glands until late, and when removed have much less tendency to recur than the other varieties. It is in fact much less malignant.

Duct carcinoma or columnar-celled carcinoma originates from the epithelium of the lactiferous ducts. The growth is thus found in the centre of the gland. Growth,

as a rule, is quite slow, the nipple is only occasionally retracted. The axillary glands are involved but rather late in its course. The growth, if left alone, reaches to and involves the skin, leading to ulceration and the protrusion of a fungous mass. When this form of carcinoma is freely removed the tendency toward recurrence is slight.

Treatment and prognosis. In all cases at all amenable to treatment, there is but one method that can be advised, and that is early and wide excision of the disease. This will include amputation of the breast and the removal of the axillary glands and pectoral fascia. This operation of excision of the breast, with clearing out of the axilla, is in itself not free from danger, but ranks as a major operation, with a death rate of from three to ten per cent. Needless to say the earlier and more radical the operation, the better will be the result, so that operation should always be undertaken as soon as a diagnosis has been made. The common, early diagnostic signs of scirrhus may be summarized as follows:—An ill defined, hard, and usually painful lump, occurring in the periphery of the gland, in a woman about the menopause, moving only with the breast tissue, causing somewhat later retraction of the nipple and dimpling of the skin, with early involvement of the axillary glands, will prove to be scirrhus. All of these features are of course not constantly found.

Dennis says: "The earlier the disease can be detected and operated upon, the better the prognosis as regards recurrence, and in a large number of cases the disease can be diagnosticated at a time before glandular infection has taken place; and if the tumor can be removed within six months from its incipency, and the axillary glands and fatty tissue can be dissected out, and likewise the pectoral fascia and the peri-mammary and para-mammary areolar tissue, the prognosis will yield brilliant results."

Wide infiltration of the skin, extensive adhesion to the pectoral muscle or to the thoracic parietes, very large

axillary glands or enlarged mediastinal glands, or involvement of the supraclavicular glands, all tend to contraindicate operation with the hope of giving permanent relief, but even in such, excision of the breast and axillary glands may at times be undertaken for the relief of the local symptoms, and the prolongation of life.

In undertaking an operation for the eradication of this disease, no partial one should be performed. The rule must be, excise wide of all affected tissues, remembering that there is an area of affected tissue outside those portions visibly affected. In all cases it is necessary, too, to open up the axilla and eradicate the glands and axillary fat. Further it is advisable in all cases to remove the fascia covering the pectoralis major, for it is in this fascia that the lymphatics lie which transport the epithelial cells from the primary growth to their secondary seats of growth in the axilla. If the pectoralis major muscle be involved superficially, the muscle must be completely excised. One should not cut into the tumor and then use the same knife, without careful sterilization, to make further incisions. It is the epithelial cells of the growth from which growth occurs, and the opening up of the tumor and after use of the knife might transfer these cells to the wound surface, where, under favorable conditions, they would grow, reproducing the carcinoma.

Recurrence of the growth after operation is the greatest danger in carcinoma, and this danger is the greater the later the operation is undertaken, or when the skin is involved, or there is marked glandular involvement. Dennis, carrying out his principles of early operation and wide removal of the breast and lymph tracts, has had a series of brilliant results. In his first series he had forty three per cent of permanent recoveries after the three year limit, with recurrence, either local, in glands, or in bones or viscera, in the remainder. In his last series of cases he

has had one death, two local recurrences, and ten permanent recoveries, two cases have not yet reached the limit, but are yet free from recurrence. No partial operation can claim these results, but it is well perhaps to remember that these cases were, at least, moderately early in their course. With partial or late operation, recurrence is the rule, usually within a few months, either in the scar, in the axilla, or internally. When possible, all recurrences should be immediately excised, as removal holds out the only hope.

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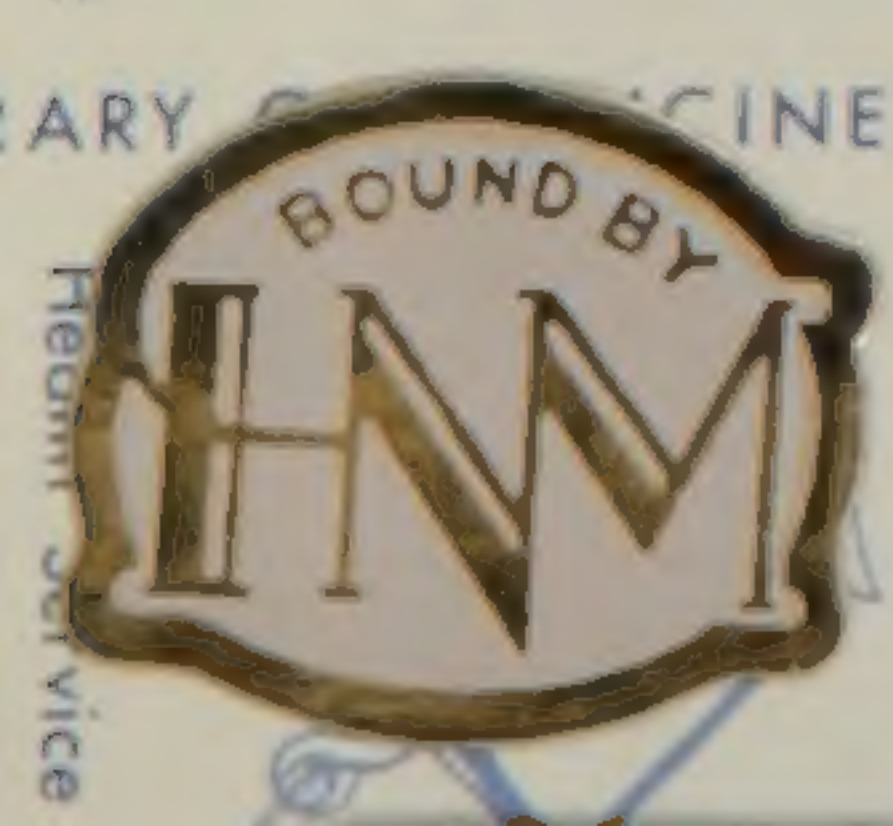
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